

U. S. DEPARTMENT OF AGRICULTURE.
OFFICE OF EXPERIMENT STATIONS.

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DIETARY STUDIES AT THE MAINE
STATE COLLEGE IN 1895.

BY

WHITMAN H. JORDAN, M. S.,

*Director Maine Agricultural Experiment Station and Professor
of Agriculture, Maine State College.*



WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1897

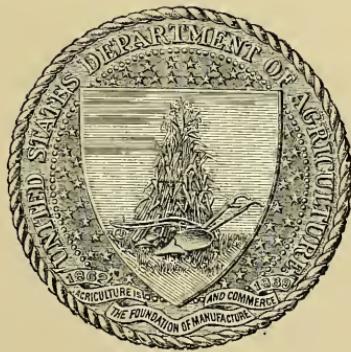


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LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., January 15, 1

SIR: I have the honor to transmit herewith a report on dietary studies at the Maine State College in 1895, by Prof. W. H. Jordan. These investigations constitute part of the inquiries made with funds appropriated by Congress "to enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food," and were conducted under the immediate supervision of Prof. W. O. Atwater, special agent in charge of nutrition investigations, in accordance with instructions given by the Director of this Office.

In carrying out the provisions of the above act representative localities have been selected in different parts of the country and dietary studies have been made. These have hitherto been attempts to learn the kinds and amounts of food actually consumed by people of various ages and occupations in different regions. No attempt has been made to control the kind or amount of food used.

In the present investigation the attempt was made to control the sources of protein. It was furnished in cheap and in expensive forms. The influence of an abundance of milk in a dietary was also studied. The results obtained were compared with those of a dietary study made under normal conditions. The investigation may be termed a feeding experiment with man.

The Maine State College offered special facilities for the prosecution of such an investigation. The college has well-equipped chemical laboratories, and Professor Jordan has had much experience in experiments on animal nutrition.

All the chemical analyses, and also other details of the studies, were executed by F. C. Moulton, M. S., assistant chemist at the Maine Station, to whom much credit is due for the faithful work that was necessary for bringing the studies to a successful conclusion.

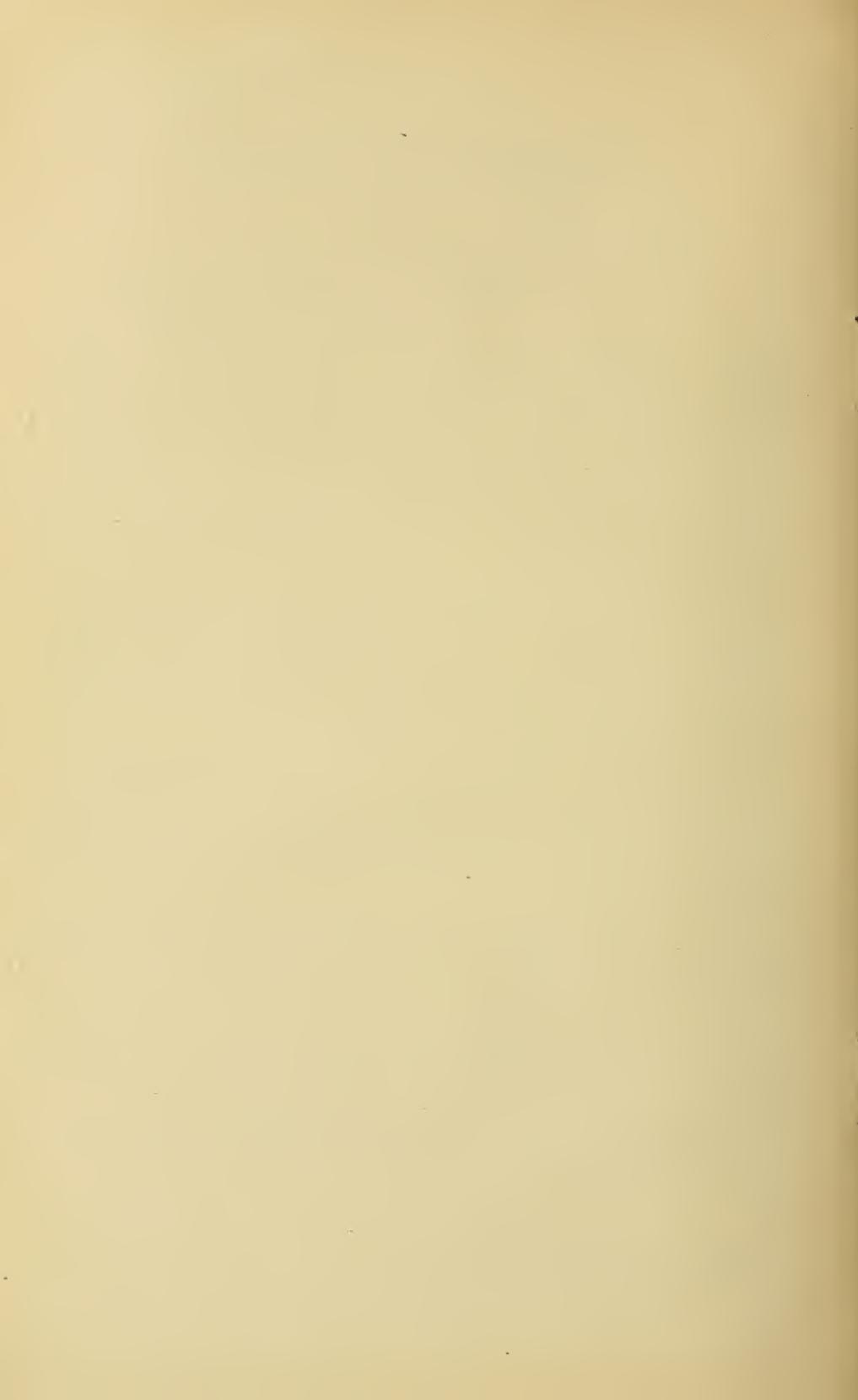
The accompanying report is respectfully submitted, with the recommendation that it be published as Bulletin No. 37 of this Office.

Respectfully,

A. C. TRUE,

Director.

Hon. J. STERLING MORTON,
Secretary of Agriculture.



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DIETARY STUDIES AT THE MAINE STATE COLLEGE.

INTRODUCTORY.

Recent discussions in the field of human food economics have dealt largely with the problems involved in purchasing the so-called raw materials. The man of moderate means is taught that whether he is well fed or not does not depend upon what he pays for the food supplied to his family, but is determined by the amount and kind of nutritive ingredients which he consumes. He is told further that the protein from the neck is just as nutritious as the protein from porterhouse steak when the skill of the cook renders it as palatable and digestible. It has been repeatedly demonstrated on the basis of chemical analyses and market prices that the edible dry matter of oysters, clams, poultry, and the choice cuts of beef has a market cost much greater than that of the edible dry matter from a fore quarter of beef, or from pork, milk, and cheese. Consequently the housewife and boarding-house steward are assured that there is an opportunity to keep down the cost of supplying the table by purchasing those materials which furnish a unit of nutrition for the least money, provided they can be prepared for the table in such palatable forms that they are relished and eaten without excessive waste.

It is quite evident, however, that these conditions are more difficult in the concrete than in the abstract. The lack of culinary skill, the necessity for a desirable variety of foods, and the marked differences of individual tastes are all obstacles to the easy application of laboratory demonstrations to the management of a dietary.

It was felt that if these views of food economics could be made useful in practice it would be well worth while to show this by accurate experimental data. It was decided, therefore, that nothing could be undertaken more desirable from a practical standpoint than to attempt an application of the considerations above mentioned.

The work attempted was something more than an ordinary dietary study where the supply of raw materials was simply such as would be dictated by the season, condition of the market, etc. It was rather a dietary study where the supply of raw materials was deliberately controlled in such a manner as to make possible a comparison of the relative cost of different sources of supply.

Whatever opinion may be entertained as to the success and value of this experiment, it certainly has the merit of being perhaps the first attempt in this country to apply to the study of human food economics the same deliberate control of the rations that has for a long time been exercised in similar experiments with farm animals.

THE COLLEGE COMMONS AND THE CONDITIONS UNDER WHICH THE EXPERIMENTS WERE MADE.

The college boarding house is connected with a dormitory, and is patronized chiefly by the students living in the dormitory and in neighboring fraternity clubhouses. Certain members of the college faculty and a few outside students take their dinners at the boarding house regularly, and others occasionally, thus making a larger number of dinners than of other meals. The regular student boarders were, with a single exception, all young men whose ages ranged from seventeen to twenty-three years, and who weighed on an average about 150 pounds. They were all compelled to take a fair amount of physical exercise, due to enforced military drill and to afternoon practice work in the laboratories and with engineering instruments in the field. It may be reasonably claimed that these young men performed a considerable amount of work. There were also several women, boarders and employees, who had meals regularly at the commons.

The college commons is conducted on the plan of furnishing the students with their board at cost, with the expectation that the weekly charge shall not exceed \$3 nor fall below \$2.50. As a matter of fact, the cost during these dietary studies was about \$2.75 per week.

Breakfast was served at 7, dinner at 12, and supper at 6. During the spring term of 1895 the kitchen and dining room were under the care of a matron who had received some training in the Boston School of Domestic Science. In the fall term a man who had acquired previous experience as a hotel cook served as steward. The work of cooking and care of the tables was performed chiefly by women, but the waiters were students.

The general plan of the studies may be briefly outlined as follows: At the beginning of each dietary study a careful inventory by weight was taken of all the food and food materials in the house. During the experimental period all food purchased was weighed and recorded in the same way, and all table and kitchen waste carefully collected, weighed, and desiccated for subsequent analysis. At the close of the period a second inventory of all materials on hand was taken. In this way the necessary data for ascertaining the net amounts of food consumed were secured. In nearly all cases, except with meats, samples of food materials on hand or purchased during the period were secured for analysis.

THE QUESTIONS STUDIED.

In these dietary studies, as already stated, the attempt was made to deliberately control to some extent the source and supply of animal foods. The object of this control was to bring into comparison high-cost and low-cost foods as a source of protein, with especial attention to the influence of the free use of milk as a low-cost animal food upon the character and cost of the dietary.

Milk was selected for special consideration for the following reasons:

(1) Milk has a widespread use as an article of diet, and in all civilized countries is an important item of food supply.

(2) Milk is a very valuable food. It contains a mixture of the three classes of nutrients in forms that are readily digested and assimilated.

(3) Milk is a low-cost animal food in proportion to its value as based upon chemical analysis. It is shown in Table 13 (p. 39) that when milk is purchased at \$2 per hundred pounds the cost of a pound of edible solids is 15.7 cents, while the cost of a pound of edible solids in beef at \$10.50 per hundred pounds is 34.3 cents. This is a comparison of the retail cost of milk with the cost of hind-quarter beef when purchased by the carcass. Beef bought as steak at retail prices would have a much higher comparative cost.

(4) Notwithstanding the high quality and very general distribution of milk as a food, it seems by many to be regarded as a luxury in the purchase of which economy must be exercised. This attitude toward this particular food may in part be explained by the somewhat prevalent notion that a free supply of milk in the dietary is not economical, because it is supposed that as much of other foods is eaten as would be the case if the milk were not taken. This belief runs contrary to certain generally accepted facts which relate to the physiological use of foods, and it only remains for experimental data to prove or disprove its correctness. Again, milk is not given full credit by people at large for its true nutritive value. Surprise is generally occasioned by the statement that a quart of milk has approximately the food value of a pound of steak. It is important to demonstrate for reasons of economy whether, as is the custom with many, it is wise to purchase the least possible quantity of milk and exercise little care in buying meats.

To investigate these questions, five dietary studies were made. In the first no change was made from the ordinary condition of living; in the second the protein was derived chiefly from high-priced animal foods, and the supply of milk was limited; in the third protein was derived from cheaper sources, and milk was very abundantly supplied; in the fourth and fifth no departure was made from the ordinary conditions except in the amount of milk supplied—in the fourth the milk supply being limited and in the fifth very abundant. These various questions are treated of in detail in the descriptions of the individual dietaries.

THE ANALYSES OF THE RAW MATERIALS, COOKED FOOD, AND WASTES.

Many of the raw materials, such as the dry grain products, sugar, etc., were easily sampled and analyzed in their ordinary condition.

Whenever analyses of cooked food were necessary, the samples taken were made as generous in quantity as possible. They were usually air-dried, sometimes after putting through a sausage machine, and ground.

The waste, of which there was a great quantity each day, was first chopped as fine as possible in a large box. From this a fairly large sample was selected and put through a meat grinder. A final sample

of this material was dried and ground still finer for analysis. The methods of analysis were those adopted by the Association of Official Agricultural Chemists. In order to save labor, composite samples were made of the waste, thus greatly diminishing the number of analyses.

No analyses were attempted of the uncooked beef, mutton, veal, and pork. Such analyses were deemed neither practicable nor necessary. The average composition of the principal meat products, as furnished by Atwater and Woods,¹ was used in calculating the composition of these materials.

A number of cooked meats and several kinds of refuse, for instance, bones, ham skins, fish, etc., and cooked and uncooked vegetable foods, were analyzed.

DESCRIPTIONS OF SAMPLES.

The beef consumed was almost wholly what is known in Eastern markets as refrigerator beef, and was, for the most part, butchered in Chicago.

The fresh pork, ham, etc., were such as were found in the Bangor market, and were partly local products and partly from the West.

The veal, lamb, and mutton were local products.

Of the poultry, the chickens (Maine grown) were largely from the college farm. The turkey was probably a Maine product.

Samples requiring special description are as follows:

Chicken.—Sample 73: One of the dressed fowls as bought weighed 2 pounds 6 ounces. The refuse weighed 6 ounces. Sample 341: One of the lot weighed 4.75 pounds and the refuse weighed 1.25 pounds.

Ham.—Sample 426: One entire ham weighed 13½ pounds. The refuse, consisting of skin, trimmings, and bone, weighed 3 pounds 11 ounces.

Lobster.—Sample 224: Proportion of edible portion to refuse, 5:9.

Oysters.—Sample 446: From 20.5 pounds of oysters in the shell 3.5 pounds of shelled oysters were obtained.

Eggs.—Samples 136, etc.: The weight of 1 dozen of eggs averaged 1 pound 8½ ounces, and the shell from 1 dozen weighed 2½ ounces.

Plantains.—Samples 197, 293, 298: The relation of weight of the whole fruit to the weight of edible portion was as 1.44:1.

Sweet corn.—Sample 272: Twenty-five pounds as bought gave 19 pounds ears and 6 pounds husks.

WEIGHT OF CANNED GOODS.

In the following table the weight of the contents of a can of several sorts of canned goods used in the dietary studies is given:

Average weights per can of canned goods.

	Pounds.	Grams.
Blueberries	1.30	579-595
Catsup (bottle)	1.06	482
Corn, sweet	1.20	538
Peas	1.25	551-575
Pineapple	1.50	631
Pumpkin	2.20	992
Squash	3.00	1,361
String beans	1.50	681
Tomatoes	2.00	899-931

¹ U. S. Dept. Agr., Office of Experiment Stations Bul. 28.

TABLE 1.—*Composition of fresh, edible portion of food materials.*

[Analyzed at the Maine Experiment Station.]

Kind of food material.	Reference number. ¹	Laboratory number. ²	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.
ANIMAL FOOD.³								
Beef:								
Roast.....	389	176	43.1	29.7	24.9	.....	2.3	1,605
Do.....		372	41.4	27.0	30.9	.....	.7	1,805
Do.....		436	38.7	23.7	34.9	.....	2.7	1,915
Average.....	.....	.....	41.1	26.8	30.2	.....	1.9	1,775
Boiled.....		374	18.1	26.1	54.0	.....	.9	2,805
Pressed, cooked.....	390	21	44.1	26.7	27.7	.....	1.5	1,665
Scraps, cooked.....		434	41.9	6.2	24.2	.....	27.7	1,135
Fat scraps.....		327	4.5	19.0	75.8	.....	.7	3,550
Tripe, pickled.....	456	242	87.1	11.9	.8	.....	.2	255
Do.....		432	90.7	8.1	.9	.....	.3	190
Average.....	.....	.....	88.9	10.0	.9	.....	.2	225
Bones, shank and rib.....		408	36.2	18.0	6.8	.....	39.0	620
Suet.....		375	13.9	3.3	82.1	.....	.7	3,525
Sausage, Frankfort.....		428	64.8	15.4	17.4	.....	2.4	1,020
Mutton (lamb), cooked.....	1518	23	47.1	22.1	29.4	.....	1.4	1,650
Pork:								
Ham.....	2069	88	24.5	16.7	56.0	.....	2.8	2,675
Do.....		426	34.9	18.2	42.0	.....	4.9	2,110
Average.....	.....	.....	29.7	17.5	49.0	.....	3.8	2,395
Ham, skin, etc.....		426	27.2	16.0	53.7	.....	3.1	2,565
Ham, bone.....		426	10.5	25.7	26.3	.....	37.5	1,590
Ham, fried.....	2071	17	36.6	24.4	33.2	.....	5.8	1,855
Ham, salad.....	2078	3	69.4	15.4	7.6	5.6	2.0	710
Steak, cooked.....		373	33.2	19.0	45.4	.....	1.5	2,285
Ribs, cooked.....	2122	22	33.6	26.6	37.6	.....	2.2	2,080
Fat, salt.....	2103	87	9.4	1.5	84.6	.....	4.5	3,600
Do.....		427	12.0	2.7	80.3	.....	5.0	3,440
Average.....	.....	.....	10.7	2.1	82.5	.....	4.7	3,520
Sausage.....	2529	94	31.3	15.9	50.9	.....	1.9	2,445
Do.....		416	39.5	13.5	46.0	.....	1.0	2,190
Average.....	.....	.....	35.4	14.7	48.5	.....	1.4	2,320
Poultry:								
Chicken.....	2707	73	65.5	17.3	15.9	.....	1.3	995
Do.....		341	63.8	21.3	13.4	.....	1.5	960
Average.....	.....	.....	64.7	19.3	14.6	.....	1.4	975
Chicken, refuse.....		341	44.7	31.3	11.3	.....	12.7	1,060
Fish, etc.:								
Bluefish, including bones.....	3018	213	73.7	17.3	6.4	.....	2.6	590
Cod, including bones.....	3030	109	78.5	16.1	.8	.....	4.6	335
Do.....	3031	69	77.0	19.5	1.9	.....	1.6	445
Do.....		304	79.7	18.1	.2	.....	2.0	315
Average.....	.....	.....	78.4	17.9	1.0	.....	2.7	375
Halibut, including bones.....	3047	129	74.4	18.0	6.6	.....	1.0	615
Do.....	3048	180	70.8	16.3	11.1	.....	1.8	770
Do.....		285	72.8	15.6	10.3	.....	1.3	725
Do.....		353	73.8	17.3	6.6	.....	2.3	600
Average.....	.....	.....	72.9	16.8	8.7	.....	1.6	680
Salmon, including bones.....	3059	259	70.5	19.8	8.4	.....	1.3	720
Shad.....	3102	148	65.7	17.2	10.7	.....	6.4	770
Do.....	3103	195	72.1	19.1	5.7	.....	3.1	595
Average.....	.....	.....	68.9	18.1	8.2	.....	4.8	680
Cod, salt.....	3121	86	55.9	27.6	.7	.....	15.8	540
Clams, shelled.....	3153	135	89.8	10.6	1.1	5.2	2.3	340

¹ The numbers used in an unpublished compilation of analyses of American food materials.² The laboratory numbers of the Maine Station.³ In case of beef, mutton, and pork only cooked meats were analyzed.

TABLE 1.—Composition of fresh, edible portion of food materials—Continued.

Kind of food material.	Reference number.	Laboratory number.	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.	
ANIMAL FOOD—continued.									
Fish, etc.—Continued.			<i>Per ct.</i>	Per ct.	Per ct.	Per ct.	Per ct.	<i>Calories.</i>	
Oysters, shelled	3197	68	91.0	5.7	0.9	1.7	0.7	175	
Do.....		290	92.4	4.5	.5	1.5	1.1	135	
Do.....		389	90.0	5.4	1.3	2.3	1.0	200	
Do.....		446	82.2	7.3	1.8	6.2	2.5	330	
Average.....			88.9	5.7	1.1	2.9	1.4	205	
Oyster shells		446	13.5	.9	.5	.....	85.1	40
Lobster.....	3162	224	68.6	25.4	2.0	.....	4.0	555
Eggs.....	2757	210	73.0	15.6	10.5	.....	.9	735
Do.....	2758	136	73.5	16.0	9.9	.....	.6	715
Do.....	2759	152	73.6	15.4	10.0	.....	1.0	710
Do.....	2760	142	73.2	13.9	11.9	.....	1.0	760
Do.....	2761	218	72.4	16.2	10.3	.....	1.1	735
Do.....	2762	257	72.9	15.2	10.9	.....	1.0	745
Do.....	2763	269	72.3	16.5	10.4	.....	.8	745
Cheese.....	3542	44	30.2	28.3	35.5	1.8	4.2	2,060	
Butter.....		37	7.2	7.1	83.4	.....	2.3	3,600
Do.....		67	12.7	1.5	81.4	.....	4.4	3,465
Do.....		138	14.6	1.1	80.8	.....	3.5	3,430
Do.....		191	11.8	2.9	81.1	.....	4.2	3,475
Do.....		205	14.1	1.0	80.1	.....	4.8	3,400
Do.....		254	11.5	.5	81.6	.....	6.4	3,450
Do.....		282	7.1	2.1	89.1	.....	1.7	3,800
Do.....		296	13.5	2.1	82.7	.....	1.7	3,520
Do.....		297	18.1	.8	79.8	.....	1.3	3,385
Do.....		333	22.7	3.5	71.4	.....	2.4	3,080
Do.....		338	12.6	.4	82.3	.....	4.7	3,480
Do.....		342	10.6	5.1	81.3	.....	3.0	3,525
Do.....		346	12.8	.8	84.4	.....	2.0	3,580
Do.....		429	13.6	1.8	81.2	.....	3.4	3,460
Average.....			13.0	2.2	81.5	.....	3.3	3,480
Milk.....			87.1	3.2	3.5	5.5	.7	310	
Do.....			87.6	3.2	3.6	4.9	.7	305	
Average.....			87.3	3.2	3.6	5.2	.7	305	
Mince meat.....	4054	179	56.9	4.7	7.3	28.6	2.5	930	
Do.....		356	49.6	6.3	8.1	33.5	2.5	1,080	
Average.....			53.3	5.5	7.7	31.0	2.5	980	
Gelatine.....			9.6	88.3	.3	.....	1.8	.....
VEGETABLE FOOD.									
Corn meal.....	5029	28	12.1	8.0	2.6	76.3	1.0	1,680	
Do.....		312	11.5	8.8	1.6	76.8	1.3	1,660	
Do.....		422	10.6	8.6	1.4	78.4	1.0	1,675	
Average.....			11.4	8.5	1.9	77.1	1.1	1,670	
Graham flour.....	5110	29	10.3	14.1	1.5	71.9	2.2	1,660	
Do.....		414	10.5	14.4	1.7	72.4	1.0	1,685	
Average.....			10.4	14.3	1.6	72.1	1.6	1,675	
Hominy.....	5039	27	11.7	6.8	.5	80.3	.7	1,640	
Do.....		393	9.2	8.5	.7	81.4	.2	1,700	
Do.....		396	12.0	8.6	.7	78.5	.2	1,650	
Average.....			11.0	8.0	.6	80.0	.4	1,660	
Oats, rolled.....	5067	30	6.3	17.4	6.9	67.7	1.7	1,875	
Do.....		5068	204	5.5	18.0	5.6	68.4	2.5	1,845
Do.....		309	7.3	17.7	7.0	64.2	3.8	1,820	
Do.....		352	6.2	11.0	7.3	70.8	4.7	1,830	
Average.....			6.3	16.0	6.7	67.8	3.2	1,840	
Rice.....	5082	31	13.0	9.1	.7	76.7	.5	1,625	
Do.....		400	13.5	8.4	.4	77.2	.5	1,610	
Average.....			13.2	8.8	.6	76.9	.5	1,620	

TABLE 1.—Composition of fresh, edible portion of food materials—Continued.

Kind of food material.	Reference number.	Laboratory number.	Wat. r.	Protein.	Fat.	Carbo-hydrate.	Ash.	Fuel value per pound.
VEGETABLE FOOD—continued.								
Wheat flour:								
Bread.....	5235	190	Per et.	Per et.	Per et.	Per et.	Per et.	Calories.
Do.....		423	8.8	10.8	1.1	78.2	1.1	1,700
Average.....			11.5	13.4	.9	73.4	.8	1,655
Pastry.....	5257	189	10.2	12.1	1.0	75.8	.9	1,675
Do.....		424	9.5	10.4	.8			
Average.....				10.2	11.4	1.2	76.0	1.2
Mixed.....	5258	25	11.4	9.7	.6	77.4	.9	1,645
Do.....	5259	121	11.4	9.7	.6	77.4	.9	1,645
Average.....								
Macaroni.....	5297	48	11.4	9.7	.6	77.4	.9	1,645
Bread:								
Wheat.....	5431	20	18.4	6.9	.9	72.7	1.1	1,520
Brown.....	5432	6	40.0	5.0	2.4	50.7	1.9	1,135
Corn cake.....	5433	13	28.4	10.1	3.1	54.3	4.1	1,330
Do.....	5434	233	47.5	6.9	2.3	40.3	3.0	975
Average.....				37.9	8.5	2.7	47.3	3.6
Cake:								
Chocolate.....		439	9.8	7.5	15.5	66.2	1.0	2,025
Frosted.....	5455	12	26.5	5.3	8.6	58.3	1.3	1,545
Do.....	5456	173	15.2	5.8	9.1	67.3	2.6	1,745
Do.....	5457	238	11.4	7.5	10.6	67.1	3.4	1,835
Do.....	5462	362	12.0	5.1	9.5	71.0	2.4	1,815
Do.....		440	16.4	5.0	9.4	66.5	2.7	1,725
Average.....			16.3	5.7	9.4	66.1	2.5	1,730
Fruit.....	5458	5	18.1	5.3	9.4	65.8	1.4	1,720
Do.....	5459	167	18.3	6.7	12.6	60.9	1.5	1,790
Do.....	5460	230	14.4	6.6	9.3	67.5	2.2	1,770
Do.....		363	18.4	4.8	12.4	62.2	2.2	1,770
Average.....			17.3	5.9	10.9	64.1	1.8	1,760
Gingerbread.....	5461	174	16.1	5.4	9.5	64.7	4.3	1,705
Marbled.....	5462	172	18.5	7.1	9.3	63.9	1.2	1,715
Do.....		437	12.0	6.3	14.7	64.7	2.3	1,940
Average.....			15.2	6.7	12.0	64.3	1.8	1,825
Sponge.....	5463	168	16.9	5.7	6.4	69.4	1.6	1,665
Do.....	5464	235	6.3	7.3	12.8	71.1	2.5	2,000
Do.....		367	22.7	5.8	13.0	57.3	1.2	1,720
Average.....			15.3	6.3	10.7	65.9	1.8	1,795
Cookies:								
Molasses.....	5470	16	4.5	6.7	8.6	77.8	2.4	1,935
Do.....	5471	165	5.7	6.0	11.8	74.4	2.1	1,995
Do.....	5472	228	5.2	6.8	8.1	78.4	1.5	1,925
Do.....		368	4.0	7.1	9.5	76.4	3.0	1,955
Do.....		438	7.4	9.7	10.3	70.3	2.3	1,925
Average.....			5.4	7.3	9.7	75.4	2.2	1,950
Sugar.....	5473	15	4.5	4.5	5.3	84.4	1.3	1,875
Do.....	5474	166	10.4	7.9	11.2	69.4	1.1	1,910
Do.....	5475	229	6.5	8.0	10.1	72.0	3.4	1,915
Do.....		364	4.3	7.3	12.6	73.9	1.9	2,040
Average.....			6.4	6.9	9.8	75.0	1.9	1,940
Crackers:								
Butter.....	5484	45	6.9	9.2	13.6	69.4	.9	2,035
Do.....		369	3.6	10.3	13.6	71.3	1.2	2,090
Average.....			5.3	9.2	13.6	70.9	1.0	2,065

TABLE 1.—Composition of fresh, edible portion of food materials—Continued.

Kind of food material.	Reference number.	Laboratory number.	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.
VEGETABLE FOOD—continued.								
Crackers—Continued.								
Oyster	5481	46	4.8	10.7	12.7	70.9	0.9	2,055
Do.....		210	4.6	9.8	12.2	69.1	4.3	1,980
Do.....		365	4.7	9.1	13.0	70.8	2.4	2,035
Do.....		444	4.4	9.6	10.4	69.7	5.9	1,915
Average			4.6	9.8	12.1	70.1	3.4	1,995
Doughnuts	5487	14	15.3	5.1	25.7	52.5	1.4	2,155
Do.....	5488	164	19.3	6.9	23.0	50.0	.8	2,030
Do.....	5489	171	17.8	7.1	22.6	51.5	1.0	2,045
Do.....	5490	227	11.6	7.6	16.4	63.2	1.2	2,010
Do.....		361	17.0	6.9	22.3	51.9	1.9	2,035
Do.....		441	11.0	7.0	19.6	62.1	.3	2,110
Average			15.3	6.8	21.6	55.2	1.1	2,065
Pie:								
Apple.....	5492	1	45.5	2.6	7.7	43.3	.9	1,180
Do.....	5493	169	42.3	3.4	10.6	41.5	2.2	1,280
Do.....	5494	231	41.8	3.8	11.3	40.2	2.8	1,295
Do.....		358	40.2	2.8	9.7	46.3	1.1	1,320
Average			42.5	3.2	9.8	42.8	1.7	1,270
Cream	5495	2	30.9	5.6	6.9	55.5	1.1	1,430
Do.....	5496	236	27.8	5.6	9.3	55.8	1.5	1,535
Do.....		360	37.2	2.1	17.9	42.3	.5	1,580
Average			32.0	4.4	11.4	51.2	1.0	1,515
Custard	5497	237	62.4	4.2	6.3	26.1	1.0	830
Lemon.....	5498	170	47.4	3.6	10.1	37.4	1.5	1,190
Mince	5499	11	34.1	5.5	14.5	44.0	1.9	1,030
Do.....	5500	232	51.1	7.5	9.7	30.4	1.3	1,115
Do.....		359	38.8	4.5	12.6	39.7	4.4	1,355
Average			41.3	5.8	12.3	38.1	2.5	1,335
Raisin.....		442	37.0	3.0	11.3	47.2	1.5	1,410
Squash	5501	8	64.2	4.4	8.4	21.7	1.3	840
Pudding:								
Tapioca.....	5502	177	52.0	4.2	4.8	38.1	.9	990
Do.....	5503	239	71.6	3.0	2.6	21.9	.9	570
Average			61.8	3.6	3.7	30.0	.9	780
Tapioca	5509	53	12.3	.6	.3	86.6	.2	1,635
Corn starch.....	5507	144	14.0	.....	.1	85.9	.....	1,600
Chocolate.....	4058	47	10.3	12.5	47.1	26.8	3.3	2,700
Do.....		391	1.5	13.4	50.2	33.8	1.1	2,995
Average			5.9	12.9	48.7	30.3	2.2	2,860
Molasses.....	6108	41	24.4	.....	.....	72.9	2.7	1,355
Do.....	6109	270	24.4	.....	.....	73.1	2.5	1,360
Do.....		425	19.0	1.3	.....	76.7	3.0	1,450
Average			22.6	.4	.....	74.3	2.7	1,390
Maple syrup	6095	120	34.7	.....	.....	64.7	.6	1,205
Do.....	6097	148	21.6	.....	.....	76.6	1.8	1,425
Do.....	6096	162	30.1	.....	.....	69.1	.8	1,285
Average			28.8	.....	.....	70.1	1.1	1,305
Beans:								
Dry, mixed	6514	64, 65	12.9	21.2	1.7	59.8	4.4	1,580
Dry, Yellow Eye	6512	104	14.3	23.4	1.4	57.2	3.7	1,560
Dry, white.....	6513	105	14.5	22.1	1.6	57.7	4.1	1,550
Average			13.9	22.2	1.6	58.2	4.1	1,560
Baked	6854	4	59.9	8.1	6.8	23.2	2.0	870
String, canned.....		381	95.0	1.0	.1	3.0	.9	80

TABLE 1.—*Composition of fresh, edible portion of food materials—Continued.*

Kind of food material.	Reference number.	Laboratory number.	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.
VEGETABLE FOOD—continued.								
Beets	6537	63	87.2	1.7	0.1	9.8	1.2	220
Do.		280	90.4	1.3	.2	7.3	.8	165
Do.		379	84.3	1.8	.2	11.7	2.0	260
Average			87.3	1.6	.2	9.6	1.3	215
Cabbage	6544	81	91.3	1.4	.1	6.5	.7	100
Do.		271	92.8	1.3	.1	5.2	.6	125
Do.		351	91.5	1.5	.3	6.0	.7	155
Average			91.8	1.4	.2	5.9	.7	145
Carrots	6562	134	83.1	1.3	.3	13.8	1.5	295
Do.		350	88.6	1.0	.3	9.2	.9	205
Average			85.9	1.1	.3	11.5	1.2	245
Celery		420	93.1	1.1	.2	4.6	1.0	115
Corn, sweet, canned	6967	7	75.0	2.9	1.3	20.3	.5	485
Do.	6968	184	83.5	2.7	1.2	11.5	1.1	315
Average			79.3	2.8	1.2	15.9	.8	400
Corn, sweet, from ears		272	72.8	2.8	1.0	22.6	.8	515
Cucumbers		322	95.0	.5	.5	3.4	.6	95
Cucumber pickles	6610	106	89.0	.5	.5	5.4	4.6	130
Do.		370	94.4	.7	.2	1.4	3.3	45
Average			91.7	.6	.3	3.4	4.0	85
Dandelion greens	6569	234	81.4	2.4	1.0	10.6	4.6	285
Horse-radish:								
Evaporated		308	4.3	11.0	.8	77.7	6.2	1,685
Wet	6780	113	87.5	1.2	.2	9.6	1.5	219
Do.		421	85.4	1.6	.1	11.3	1.6	215
Average			86.5	1.4	.1	10.4	1.6	225
Lettuce	6580	201	92.7	1.3	.2	4.9	.9	125
Onions	6589	61	85.6	4.4	.4	8.8	.8	250
Do.		277	87.6	1.7	.2	9.7	.8	220
Do.		376	89.4	1.6	.5	7.9	.6	200
Average			87.5	2.6	.4	8.8	.7	230
Parsnips	6591	153	79.5	1.5	.8	16.7	1.5	375
Peas:								
Dry	6596	78	8.8	25.2	1.2	62.6	2.2	1,685
Canned	7070	74	77.8	3.2	.8	17.4	.8	420
Do.	7071	128	83.2	3.6	.3	9.3	.6	255
Do.		382	82.5	4.2	.3	11.8	1.2	310
Average			82.1	3.7	.5	12.8	.9	330
Potatoes	6683	57	74.4	2.4	.1	22.2	.9	461
Do.	6684	58	80.3	2.1	.1	16.4	1.1	350
Do.	6685	188	67.8	2.7	.2	27.4	1.9	570
Do.		276	77.1	2.0	.1	19.8	1.0	410
Do.	291	77.1	2.2	.2	.1	19.7	.8	415
Do.	348	77.6	2.1	.1	.1	19.1	1.1	400
Do.	406	80.4	1.5	.1	.1	17.5	.5	355
Average			76.4	2.1	.1	20.3	1.1	420
Potatoes, boiled	6613	54	69.7	3.0	.4	25.5	1.4	545
Do.		371	72.0	3.1	.2	23.9	.8	510
Do.		439	70.3	2.3	.1	26.5	.8	540
Average			70.7	2.8	.2	25.3	1.0	530
Pumpkin, canned	7079	66	88.2	1.1	.2	9.6	.9	205
Do.	7080	186	89.5	1.2	.3	7.5	1.5	175
Average			88.9	1.1	.2	8.6	1.2	190
Radishes	6779	202	86.6	3.0	.3	8.3	1.8	225
Rhubarb	6782	241	96.1	.3	.1	2.9	.6	65

TABLE 1.—Composition of fresh, edible portion of food materials—Continued.

Kind of food material.	Reference number.	Laboratory number.	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.
VEGETABLE FOOD—continued.								
Squash:								
Canned	7084	115	86.8	1.6	1.2	9.7	0.7	260
Do	7085	185	89.9	.8	.4	8.2	.7	185
Average			88.4	1.2	.8	8.9	.7	220
Green.....	6796	117	78.9	2.9	.8	16.1	1.3	385
Do	6797	160	83.8	3.1	1.4	10.1	1.6	305
Do		273	88.2	1.6	.4	8.9	.9	210
Average			83.6	2.5	.9	11.7	1.3	300
Sweet petatoes.....			275	63.0	1.5	.4	34.3	.8
Do			302	67.9	.8	.3	29.3	1.7
Do			335	62.8	3.0	.5	32.9	.8
Do			343	64.9	2.0	.5	31.3	1.3
Average			64.7	1.8	.4	31.9	1.2	615
Turnips			6831	62	85.6	2.1	.4	11.1
Do			6832	92	70.1	3.9	.1	23.8
Do				323	87.5	.7	.4	10.6
Average					81.1	2.2	.3	15.2
Tomatoes:								
Canned	7110	126	95.1	1.0	.2	3.2	.5	85
Do		380	97.9	.4	.1	1.4	.2	40
Average					96.5	.7	.2	2.3
Fresh.....			300	94.1	1.3	.2	3.7	.7
Do			329	93.9	1.3	.4	3.6	.8
Average					94.0	1.3	.3	3.7
Vegetable mixture.....		4055	178	80.5	6.0	1.9	9.2	365
Tomato catsup.....			6818	38	77.7	2.0	.4	16.1
Do				384	87.8	1.1	.1	8.5
Average					82.7	1.6	.2	12.3
Apples:								
Evaporated	8066	139	47.4	1.2	1.4	48.6	1.4	985
Do	8067	219	28.2	1.3	5.0	62.8	2.7	1,405
Average					37.8	1.2	3.2	55.7
Fresh.....			8009	59	82.6	.3	.2	16.6
Do			8008	60	77.9	.5	.2	20.8
Do			8010	82	82.9	.1	.2	16.4
Do			274	87.7	.3	.3	11.1	.6
Do			292	83.4	.3	.6	15.3	.4
Do			294	87.0	.4	.3	11.9	.4
Do			317	80.5	.2	.3	18.6	.4
Do			325	85.6	.3	1.0	12.8	.3
Do			344	82.2	.4	.7	16.3	.4
Do			377	83.0	.5	.6	15.7	.2
Do			378	87.4	.3	.3	11.8	.2
Do			399	83.3	.3	.5	15.8	.1
Do			405	87.3	.3	.3	11.8	.3
Average					83.9	.3	.4	15.0
Apple sauce			357	61.1	.2	.8	37.2	.7
Apricots, dried.....	8069	139	18.8	3.1	2.2	71.9	4.0	1,485
Apricot sauce	8070	219	45.2	1.9	1.3	48.8	2.8	1,000
Bananas:								
Whole	8015	197	80.1	1.2	1.0	16.6	1.1	375
Do		293	80.5	1.4	.8	15.9	1.4	355
Do		298	85.8	.7	.4	12.0	1.1	255
Average					82.1	1.1	.7	14.9
Edible portion			390	78.7	1.0	.4	19.4	.5
Pee...			390	85.5	.8	1.2	10.9	1.6
Blackberries:								
Canned	8082	71	40.0	.8	2.1	56.4	.7	1,150
Fresh		387	78.4	1.1	2.9	16.7	.9	455

TABLE 1.—Composition of fresh, edible portion of food materials—Continued.

Kind of food material.	Reference number.	Laboratory number.	Water.	Protein.	Fat.	Carbohydrate.	Ash.	Fuel value per pound.
VEGETABLE FOOD—continued.								
Blueberries, canned	8083	80	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Calories.
Do	8084	197	84.9	0.4	0.4	13.8	0.5	280
Do		383	85.7	.8	.9	12.2	.4	280
Average			86.4	.5	.5	12.4	.2	275
Citron		392	12.4	.6	2.5	83.7	.8	1,675
Crab apples, canned	8081	10	42.4	.3	2.4	54.4	.5	1,120
Cranberries		315	89.5	.4	.4	9.5	.2	200
Currant jelly		278	24.3	.2	7.1	67.5	.9	1,500
Grapes, fresh		447	72.0	1.1	1.1	25.5	.3	510
Lemons, whole	8026	108	85.4	1.9	.8	11.0	.9	275
Oranges, whole	8037	107	83.8	1.3	.6	13.7	.6	305
Pineapples, canned	8086	187	61.8	.4	.7	36.4	.7	715
Prunes:								
Dry	8077	34	20.5	3.5	3.5	64.7	7.8	1,415
Do	8078	151	23.2	3.1	2.9	68.0	2.8	1,445
Average			21.8	3.3	3.2	66.4	5.3	1,430
Whole		412	17.9	3.3	.8	74.9	3.1	1,490
Edible portion		412	24.4	3.2	.4	69.1	2.9	1,360
Stones		412	18.0	3.4	1.4	74.2	3.0	1,500
Prune sauce		443	76.6	.5	.1	22.3	.5	430
Raisins	8079	52	7.1	2.6	7.2	78.1	5.0	1,805
Do	8080	111	21.0	2.3	2.3	71.3	3.1	1,465
Do		297	15.7	3.0	.5	78.8	2.0	1,540
Average			14.6	2.6	3.3	76.1	3.4	1,605
Zante currants, dry	8071	33	20.6	1.0	4.7	71.4	2.3	1,545
Do	8072	112	35.1	1.5	1.2	60.0	2.2	1,195
Do		445	7.9	2.2	.7	80.1	9.1	1,560
Average			21.2	1.6	2.2	70.5	4.5	1,435

TABLE 2.—Composition of water-free substance of edible portion of food materials.

[Analyzed at the Maine Experiment Station.]

Kind of food material.	Reference number.	Laboratory number.	Nitrogen.	Protein by difference.	Fats.	Carbohydrates.	Ash.
ANIMAL FOOD.							
Beef:			Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Roast	389	176	8.14	52.2	43.8		4.0
Do		372	7.30	46.1	52.7		1.2
Do		436	6.55	38.7	56.9		4.4
Average				45.7	51.1		3.2
Boiled		374	5.12	31.9	67.0		1.1
Pressed, cooked	390	21	6.76	47.8	49.5		2.7
Scraps, cooked		434	7.29	41.6	47.7		10.7
Fat scraps		327	2.74	19.9	79.4		.7
Tripe, pickled	456	242	14.55	92.2	6.2		1.6
Do		432	13.36	87.1	9.7		3.2
Average				89.7	7.9		2.4
Bones, shank and rib		408	3.29	28.2	10.7		61.1
Suet		375	.51	3.8	95.4		.8
Sausage, Frankfort		428	6.66	43.8	49.4		6.8
Mutton (lamb), cooked	1518	23	7.17	41.8	55.6		2.6
Pork:							
Ham	2060	88	2.97	22.1	74.2		3.7
Do		426	4.79	28.0	64.5		7.5
Average				25.1	69.3		5.6

TABLE 2.—*Composition of water-free substance of edible portion of food materials—Cont'd.*

Kind of food material.	Reference number.	Laboratory number.	Nitrogen	Protein by difference.	Fats.	Carbohydrates.	Ash.
ANIMAL FOOD—continued.							
Pork—Continued.			Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Ham skin, etc.	426	3.37	22.0	73.8			4.2
Ham bone.	426	4.47	28.7	29.4			41.9
Ham, fried.	2071	17	5.60	38.5	52.4		9.1
Ham salad.	2078	3	—	50.3	24.9	18.3	6.5
Steak, cooked.	373	—	29.8	68.0			2.2
Ribs, cooked.	2122	22	5.98	40.0	56.7		3.3
Fat, salt.	2103	87	.20	1.6	93.4		5.0
Do.	427	—	.46	3.1	91.2		5.7
Average.			—	2.4	92.3		5.3
Sausage.	2529	94	1.70	23.1	74.1		2.8
Do.	416	—	3.30	22.3	76.0		1.7
Average.			—	22.7	75.1		2.2
Poultry:							
Chicken.	2707	73	8.04	50.1	46.1		3.8
Do.	341	—	9.25	58.8	37.0		4.2
Average.			—	54.5	41.5		4.0
Chicken, refuse.	341	—	8.21	56.6	20.4		23.0
Fish, etc.:							
Bluefish, with bones.	3018	213	9.84	65.8	24.3		9.9
Cod, with bones.	3030	109	10.94	74.9	3.7		21.4
Do.	3031	69	13.99	84.8	8.3		6.9
Do.	304	—	13.25	89.2	1.0		9.8
Average.			—	83.0	4.3		12.7
Halibut, with bones.	3047	120	11.02	70.3	25.8		3.9
Do.	3048	180	8.89	55.8	38.0		6.2
Do.	285	—	9.67	57.3	37.9		4.8
Do.	353	—	10.46	66.0	25.2		8.8
Average.			—	62.4	31.7		5.9
Salmon, with bones.	3089	259	1.72	67.1	28.5		4.4
Shad.	3102	148	8.47	50.1	31.2		18.7
Do.	3103	195	10.59	68.5	20.4		11.1
Average.			—	59.3	25.8		14.9
Cod, salt.	3121	86	8.56	62.6	1.6		35.8
Clams, shelled.	3153	135	8.89	55.2	5.7	27.1	12.0
Oysters, shelled.	3197	68	9.27	63.3	10.0	18.9	7.8
Do.	290	—	9.19	57.4	6.6	21.5	11.5
Do.	389	—	8.64	54.0	13.0	23.0	10.0
Do.	446	—	6.56	41.0	10.1	34.8	14.1
Average.			—	54.4	9.9	24.1	11.6
Oyster shells.	446	—	—	1.0	.6		98.4
Lobster.	3162	224	11.73	80.9	6.4		12.7
Eggs.	2757	210	7.49	57.8	28.9		3.3
Do.	2758	136	8.66	60.4	37.3		2.3
Do.	2759	152	7.87	58.3	37.9		3.8
Do.	2760	142	7.37	51.9	44.4		3.7
Do.	2761	218	7.00	58.7	37.3		4.0
Do.	2762	257	7.30	56.1	40.2		3.7
Do.	2763	269	6.95	59.6	37.5		2.9
Average.			—	57.5	39.1		3.4
Cheese.	3542	44	—	40.5	50.9	2.6	6.0
Butter.	37	—	—	7.6	89.9		2.5
Do.	67	—	—	1.7	93.3		5.0
Do.	138	—	—	1.3	94.6		4.1
Do.	191	—	—	3.3	91.9		4.8
Do.	205	—	—	1.2	93.2		5.6
Do.	254	—	—	.6	92.2		7.2
Do.	282	—	—	2.3	95.9		1.8
Do.	296	—	—	2.4	95.6		2.0
Do.	297	—	—	1.0	97.4		1.6
Do.	333	—	—	4.5	92.4		3.1

TABLE 2.—Composition of water-free substance of edible portion of food materials—Cont'd.

Kind of food material.	Reference number.	Labora- tory number.	Nitrogen.	Protein by differ- ence.	Fats.	Carbo- hydrates.	Ash.
ANIMAL FOOD—continued.							
Butter		338	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		342		0.5	94.1		5.4
Do		346		5.7	90.9		3.4
Do		429		.9	96.8		2.3
Average				2.1	94.0		3.9
Milk					2.5	93.7	3.8
Do					24.8	27.1	42.7
Average					25.8	29.0	39.5
Mince-meat	4054	179	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		356		10.9	16.9	66.4	5.8
Average				12.5	16.1	66.5	4.9
Gelatine.....	4047	39	16.06	11.7	16.5	66.4	5.4
				97.7	.3		2.0
VEGETABLE FOOD.							
Corn meal.....	5029	28	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		312		9.1	3.0	86.8	1.1
Do		422		9.9	1.8	86.8	1.5
Average				9.6	1.6	87.7	1.1
Graham flour.....	5110	29	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		414		15.7	1.7	80.2	2.4
Average				16.1	1.9	80.9	1.1
Hominy	5039	27	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		393		7.7	.6	90.9	.8
Do		396		9.4	.8	89.6	.2
Average				9.8	.8	89.2	.2
Oats, rolled.....	5067	30	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		5068		18.6	7.4	72.2	1.8
Do		204		19.1	5.9	72.4	2.6
Do		309		19.1	7.6	69.2	4.1
Average				352	7.8	75.5	5.0
Rice.....	5082	31	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		400		10.4	.8	88.2	.6
Average				9.7	.5	89.2	.6
Wheat flour:							
Bread	5235	190	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		423		11.8	1.2	85.8	1.2
Average				15.1	1.0	82.9	1.0
Pastry	5257	189	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		424		14.0	1.7	82.3	2.0
Average				11.4	.9	86.9	.8
Mixed.....	5258	25	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		5259		11.0	.7	87.3	1.0
Average				11.0	.7	87.3	1.0
Macaroni.....	5297	48	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Bread:							
Wheat	5431	20	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Brown	5432	6	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Corn cake	5433	13	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		5434		14.1	4.3	75.9	5.7
Average				13.1	4.4	76.8	5.7
Cake:							
Chocolate		439	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Frosted	5455	12	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		5456		7.2	11.7	79.3	1.8
Do		5457		6.8	10.7	79.4	3.1
Average				8.5	12.0	75.7	3.8

TABLE 2.—*Composition of water-free substance of edible portion of food materials—Cont'd.*

Kind of food material.	Reference number.	Laboratory number.	Nitrogen.	Protein by difference.	Fats.	Carbohydrates.	Ash.
VEGETABLE FOOD—continued.							
Cake—Continued.							
Frosted	362	362	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do	440	440		5.8	10.8	80.7	2.7
Average				6.0	11.2	79.6	3.2
Fruit	5458	5	Per cent.	6.5	11.5	80.3	1.7
Do	5459	167		8.2	15.4	74.6	1.8
Do	5460	230		7.7	10.9	78.9	2.5
Do		363		5.9	15.2	76.2	2.7
Average				7.1	13.2	77.5	2.2
Gingerbread	5461	174	Per cent.	6.5	11.3	77.1	5.1
Marble	5462	172	Per cent.	8.7	11.4	78.4	1.5
Do		437		7.2	16.7	73.5	2.6
Average				7.9	14.1	76.0	2.0
Sponge	5463	168	Per cent.	6.9	7.7	83.5	1.9
Do	5464	235		7.8	13.6	75.9	2.7
Do		367		7.5	16.8	74.1	1.6
Average				7.4	12.7	77.8	2.1
Cookies:							
Molasses	5470	16	Per cent.	7.0	9.0	81.5	2.5
Do	5471	165		6.4	12.5	78.9	2.2
Do	5472	228		7.2	8.5	82.7	1.6
Do		368		7.4	9.9	79.6	3.1
Do		438		10.5	11.1	75.9	2.5
Average				7.7	10.2	79.7	2.4
Sugar	5473	15	Per cent.	4.7	5.5	88.4	1.4
Do	5474	166		8.8	12.5	77.5	1.2
Do	5475	229		8.6	10.8	77.0	3.6
Do		364		7.6	13.2	77.2	2.0
Average				7.4	10.5	80.0	2.1
Crackers:							
Butter	5484	45	Per cent.	9.9	14.6	74.5	1.0
Do		369		10.7	14.1	74.0	1.2
Average				10.3	14.3	74.3	1.1
Oyster	5481	46	Per cent.	11.2	13.3	74.5	1.0
Do		210		10.3	12.8	72.4	4.5
Do		365		9.6	13.6	74.3	2.5
Do		444		10.0	10.9	72.9	6.2
Average				10.3	12.7	73.5	3.5
Doughnuts	5487	14	Per cent.	6.0	30.3	62.0	1.7
Do	5488	164		8.5	28.5	62.0	1.0
Do	5489	171		8.6	27.5	62.7	1.2
Do	5490	227		8.6	18.6	71.5	1.3
Do		361		8.3	26.9	62.5	2.3
Do		441		7.9	22.0	69.8	.3
Average				8.0	25.6	65.1	1.3
Pie:							
Apple	5492	1	Per cent.	4.8	14.1	79.5	1.6
Do	5493	169		5.9	18.4	71.9	3.8
Do	5494	231		6.5	19.4	69.3	4.8
Do		358		4.7	16.2	77.3	1.8
Average				5.5	17.0	74.5	3.0
Cream	5495	2	Per cent.	8.1	10.0	80.3	1.6
Do	5496	236		7.7	12.9	77.3	2.1
Do		360		3.3	28.5	67.4	.8
Average				6.4	17.1	75.0	1.5
Custard	5497	237	Per cent.	14.2	16.7	69.4	2.7
Lemon	5498	170		6.8	19.2	71.1	2.9

TABLE 2.—Composition of water-free substance of edible portion of food materials—Cont'd.

Kind of food material.	Reference number.	Laboratory number.	Nitrogen.	Protein by difference.	Fats.	Carbohydrates.	Ash.
VEGETABLE FOOD—continued.							
Pie—Continued.			Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Mince	5499	11		8.3	22.0	66.8	2.9
Do	5500	232		15.3	19.8	62.2	2.7
Do		359		7.3	20.6	64.9	7.2
Average				10.3	20.8	64.6	4.3
Rasin		442		4.8	17.9	74.9	2.4
Squash	5501	8		12.3	23.5	60.6	3.6
Pudding, tapioca	5502	177		8.7	10.0	79.4	1.9
Do	5503	239		10.6	9.1	77.1	3.2
Average				9.7	9.6	78.2	2.5
Tapioca	5509	53		.7	.3	98.8	.2
Corn starch	5507	144			.1	99.9	
Chocolate	4058	49		13.9	52.5	29.9	3.7
Do	39	391		13.6	51.0	34.3	1.1
Average				13.7	51.8	32.1	2.4
Molasses	6108	41				96.4	3.6
Do	6109	270				96.7	3.3
Do		425		1.6		94.7	3.7
Average				.5		96.0	3.5
Maple sirup	6095	120				99.1	.9
Do	6097	148				97.7	2.3
Do	6096	162				98.9	1.1
Average						98.6	1.4
Beans:							
Dry, mixed	6514	65		24.3	1.9	68.7	5.1
Dry, yellow	6512	104		27.3	1.7	66.7	4.3
Dry, white	6513	105		25.8	1.9	67.5	4.8
Average				25.8	1.8	67.7	4.7
Baked	6864	4		20.2	16.9	57.9	5.0
String, canned		381		20.0	2.0	60.0	18.0
Beets	6537	63		13.3	.8	76.6	9.3
Do		280		13.5	2.1	76.1	8.3
Do		379		11.5	1.3	74.5	12.7
Average				12.8	1.4	75.7	10.1
Cabbage	6544	81		16.1	1.2	74.7	8.0
Do		271		18.1	1.4	72.2	8.3
Do		351		17.7	3.5	70.6	8.2
Average				17.3	2.0	72.5	8.2
Carrots	6562	134		7.7	1.8	81.6	8.9
Do		350		8.8	2.6	80.7	7.9
Average				8.2	2.2	81.2	8.4
Celery		420		25.0	1.8	53.6	19.6
Corn, sweet, canned	6967	7		11.6	5.2	81.2	2.0
Do	6968	184		16.4	7.3	69.7	6.6
Average				14.0	6.2	75.5	4.3
Corn, sweet, from ears		272		10.3	3.7	83.1	2.9
Cucumbers		322		10.0	10.0	68.0	12.0
Cucumber pickles	6610	106		4.6	4.5	49.1	41.8
Do		370		12.5	3.6	25.0	58.9
Average				8.6	4.0	37.1	50.3
Dandelion greens	6569	234		12.9	5.4	57.0	24.7
Horse-radish:							
Evaporated		308		11.5	.8	81.2	6.5
Wet	6780	113		9.6	1.6	76.8	12.0
Do		421		11.0	.6	77.4	11.0
Average				10.7	1.0	78.5	9.8
Lettuce	6580	201		17.8	2.7	67.1	12.4

TABLE 2.—*Composition of water-free substance of edible portion of food materials—Cont'd.*

Kind of food material.	Reference number.	Laboratory number.	Nitrogen.	Protein by difference.	Fats.	Carbohydrates.	Ash.
VEGETABLE FOOD—continued.							
Onions	6589	61	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Do		277		30.6	2.8	61.1	5.5
Do		376		13.7	1.6	78.2	6.5
Average				15.1	4.7	74.5	5.7
Parsnips	6591	153		19.8	3.0	71.3	5.9
Peas:				7.3	3.9	81.5	7.3
Dry	6596	78		22.4	1.3	73.9	2.4
Canned	7070	74		14.4	3.6	78.4	3.6
Do	7071	123		26.1	2.2	67.4	4.3
Do		382		24.0	1.7	67.4	6.9
Average				21.5	2.5	71.1	4.9
Potatoes	6683	58		9.4	.4	86.7	3.5
Do	6684	57		10.7	.5	83.2	5.6
Do	6685	188		8.4	.6	85.1	5.9
Do		276		8.7	.4	86.5	4.4
Do		291		9.6	.9	86.0	3.5
Do		348		9.4	.5	85.2	4.9
Do		406		7.7	.5	89.2	2.6
Average				9.1	.5	86.0	4.4
Potatoes, boiled	6613	54		9.9	1.3	84.2	4.6
Do		371		11.3	.7	85.2	2.8
Do		439		7.7	.3	89.2	2.8
Average				9.6	.8	86.2	3.4
Pumpkin, canned	7079	66		9.3	1.7	81.4	7.6
Do	7080	186		11.4	2.9	71.4	14.3
Average				10.4	2.3	76.4	10.9
Radishes	6779	202		22.4	2.2	62.0	13.4
Rhubarb	6782	241		7.7	2.6	74.3	15.4
Squash:							
Canned	7084	115		12.1	9.1	73.5	5.3
Do	7085	185		7.9	4.0	81.2	6.9
Average				10.0	6.5	77.4	6.1
Green	6796	117		13.7	3.8	76.3	6.2
Do	6797	160		19.1	8.6	62.4	9.9
Do		273		13.6	3.4	75.4	7.6
Average				15.4	5.3	71.4	7.9
Sweet potatoes		275		4.0	1.1	92.7	2.2
Do		302		2.5	.9	91.3	5.3
Do		335		8.1	1.3	88.4	2.2
Do		343		5.7	1.4	89.2	3.7
Average				5.1	1.2	90.4	3.3
Turnips	6831	62		14.6	2.8	77.1	5.5
Do	6832	93		13.1	.3	79.6	7.0
Do		323		5.6	3.2	84.8	6.4
Average				11.1	2.1	80.5	6.3
Tomatoes:							
Canned	7110	126		20.4	4.1	65.3	10.2
Do		380		19.0	4.8	66.7	9.5
Average				19.7	4.4	66.0	9.9
Fresh		300		22.0	3.4	62.7	11.9
Do		329		21.3	6.6	59.0	13.1
Average				21.6	5.0	60.9	12.5
Vegetable mixture	4055	178		30.5	9.6	47.7	12.2
Tomato catsup	6818	38		9.0	1.8	72.2	17.0
Do		384		9.0	.8	69.7	20.5
Average				9.0	1.3	70.9	18.8

TABLE 2.—Composition of water-free substance of edible portion of food materials—Cont'd.

Kind of food material.	Reference number.	Laboratory number.	Nitrogen	Protein by difference.	Fats.	Carbohydrates.	Ash.
VEGETABLE FOOD—continued.							
Apples:							
Evaporated	8066	139	Per cent.	2.3	2.7	92.4	2.6
Do	8067	217		1.8	7.0	87.5	3.7
Average				1.5	4.6	91.5	2.4
Fresh	8009	59		1.7	1.2	95.4	1.7
Do	8008	60		2.3	.9	94.1	2.7
Do	8010	82		.6	1.2	95.9	2.3
Do		274		2.4	2.4	90.3	4.9
Do		292		1.8	3.6	92.2	2.4
Do		294		3.1	2.3	91.5	3.1
Do		317		1.0	1.5	95.4	2.1
Do		325		2.1	6.9	88.9	2.1
Do		344		2.3	3.9	91.6	2.2
Do		377		2.9	3.5	92.4	1.2
Do		378		2.4	2.4	93.6	1.6
Do		399		1.8	3.0	94.6	.6
Do		405		2.4	2.4	92.9	2.3
Average				2.1	2.7	93.0	2.2
Apple sauce		357		.5	2.1	95.6	1.8
Apricots, dried	8069	139		3.8	2.7	88.6	4.9
Apricot sauce, with stones	8070	219		3.5	2.4	89.0	5.1
Bananas:							
Whole		197		6.0	5.0	83.5	5.5
Do		293		7.2	4.1	81.5	7.2
Do		298		4.9	2.8	84.5	7.8
Average				6.0	4.0	83.2	6.8
Edible portion		390		4.7	1.9	91.1	2.3
Peel		390		5.4	3.4	75.2	11.0
Blackberries:							
Canned	8082	71		1.3	3.5	94.0	1.2
Fresh		387		5.1	13.4	77.3	4.2
Blueberries, canned	8083	80		2.7	2.6	91.4	3.3
Do	8084	197		5.6	6.3	85.3	2.8
Do		383		3.7	3.6	91.2	1.5
Average				4.0	4.2	89.3	2.5
Crab apples, canned	8081	10		.5	4.2	94.4	.9
Cranberries		315		3.8	3.8	90.5	1.9
Citron		392		.7	2.9	95.5	.9
Currant jelly		278		.2	9.4	89.2	1.2
Grapes, fresh		447		3.9	3.9	91.1	1.1
Lemons, whole	8026	108		13.0	5.5	75.4	6.1
Oranges, whole	8037	107		8.0	3.7	84.6	3.7
Pineapple, canned	8086	187		1.1	1.8	95.3	1.8
Prunes:							
Dry	8077	34		4.4	4.4	81.4	9.8
Do	8078	151		4.0	3.8	88.5	3.7
Average				4.2	4.1	85.0	6.7
Whole		412		4.0	1.0	91.2	3.8
Edible portion		412		4.2	.5	91.4	3.9
Stones		412		4.1	1.7	90.5	3.7
Prune sauce		443		2.1	.5	95.3	2.1
Raisins	8079	52		2.8	7.7	84.1	5.4
Do	8080	111		2.9	2.9	90.3	3.9
Do		297		3.5	.6	93.5	2.4
Average				3.1	3.7	89.3	3.9
Zante currants, dry	8071	33		1.3	5.9	89.9	2.9
Do	8070	112		2.3	1.8	92.5	3.4
Do		445		2.4	.8	87.0	9.8
Average				2.0	2.8	89.8	5.4

THE COST OF RAW MATERIALS.

In estimating the money cost of the raw materials purchased the prices used do not represent those actually paid, but rather those which, after careful consideration, appeared to be the average for the year 1895 in the neighboring markets when supplies were bought in fairly large quantities.

It should be noted, moreover, that the following prices are those that would apply to the purchase of boarding-house supplies, where meats are bought by the side, rather than to private families, where meats are purchased for the table in cuts. The cost of all classes of raw materials is less when bought in considerable quantities, but undoubtedly a larger discount is secured on meats than on such materials as flour, sugar, etc. The assumed market cost of the principal raw materials is shown in the following table:

TABLE 3.—*Assumed market cost of the principal raw materials.*

Materials.	Cost per 100 pounds.	Materials.	Cost per 100 pounds.
Wheat flour	\$2.00	Catsup	\$19.00
Crackers	6.00	Horse-radish	15.00
Graham crackers	1.75	Pickles, cucumber	6.25
Oats, rolled	4.75	Chocolate	36.00
Corn meal, bolted	1.75	Macaroni	10.00
Hominy	9.00	Tapioca	6.00
Cornstarch	8.00	Sugar	4.50
Beans	3.50	Maple sugar	9.00
Peas, split	2.66	Beef, sides	8.00
Potatoes .....	.83	Beef, hind quarter	11.00
Pumpkin, canned	3.89	Beef, fore quarter	6.00
Squash, green	2.50	Pork, shoulders and ribs	9.00
Squash, canned	3.33	Mutton, sides	9.00
Turnips .....	.70	Veal, sides	8.00
Beets .....	.80	Smusage	8.00
Cabbage	2.00	Fowl	15.00
Carrots	1.00	Turkey	16.00
Parsnips	2.00	Eggs, no shells	13.10
Onions	2.00	Claus, shelled	8.00
Tomatoes, canned	4.23	Oysters	12.00
Peas, canned	8.05	Bacon	10.50
Sweet corn, canned	7.50	Ham	10.50
Apples	1.50	Corned beef	8.00
Blackberry jam	10.00	Salt pork	7.50
Blueberries, canned	7.50	Pickled tripe	3.75
Crab apples, canned	5.00	Cod, fresh	2.50
Lemons, whole	4.50	Cod, salt	6.00
Bananas	3.50	Haddock	3.00
Oranges, whole	4.00	Halibut	12.00
Pineapple, whole	6.00	Shad	8.00
Pineapple, canned	11.10	Bluefish	6.00
Apple, evaporated	8.00	Salmon	25.00
Zante currants, dried	6.50	Lobster, edible part	28.00
Apricots, dried	10.00	Milk	2.00
Prunes	8.00	Butter	25.00
Raisins	5.00	Lard	7.75
Molasses	2.55	Gelatine	100.00

DATA OBTAINED IN THE DIETARY STUDIES.

Tables 4 to 18 give in detail the data obtained in these dietary studies. The first table in each study shows the composition of the various food materials, the cost of each item of food, and the quantities

of protein, fats, and carbohydrates which each food material contained. These figures are then summarized so as to show the quantities and cost of the nutrients purchased in each of 11 classes of foods, both the total and the amounts per man per day, the latter being given in weights and in percentages. Finally, the quantities and cost of the animal and vegetable nutrients bought, the amounts of nutrients in the refuse and waste from each class, and the total weights and cost of the nutrients actually consumed and the amount per man per day are calculated. The latter figures are given in grams and in per cent.

It is proper to explain that the percentage composition as stated for such foods as beef, veal, mutton, pork, venison, and poultry is the proportions of edible nutrients, while for all other materials it includes all that the foods contained as purchased. The reason for this distinction is that the bones and other refuse not included in the meats as cut for the table were not included in the waste as collected, while in the case of all other materials everything purchased that was not eaten was thrown into the waste.

In general the figures given under the head of "composition" are those resulting from the analyses of the particular materials eaten. Only in the case of certain meats and in a few other instances are general averages used to calculate the composition.

THE NUMBER OF MEALS EATEN.

The number of meals eaten in the boarding house within the limits of each period was very carefully ascertained in the following manner: Books containing the names of the regular boarders were placed in the hands of the waiters (who were students), and during each meal a record was made of those present. An account was also kept of the occasional meals taken by guests.

The number of dinners is considerably larger than the number of breakfasts or suppers, a fact which has some bearing upon the discussion of the quantity of food consumed.

The statement concerning the number of meals which precedes each dietary study is therefore somewhat different from that in previous publications of this Office.

DIETARY STUDY UNDER ORDINARY CONDITIONS.

The first dietary study of the series reported in this bulletin was carried on under the same general conditions as dietary studies in other localities; that is, the attempt was made to learn the kind and amount of food consumed by the college club under ordinary conditions. No attempt was made to control the source of supply of protein. The food of the students' club was the same as that usually furnished them and the amounts consumed and wasted were ascertained in the usual way.

FIRST DIETARY STUDY OF THE COLLEGE CLUB AT MAINE STATE COLLEGE (No. 148).

[Ordinary conditions.]

The study began February 24 and continued fifty-eight days.

The number of meals taken was as follows:

	Break- fasts.	Dinners.	Suppers.
Men.....	3,921	4,393	3,924
Women.....	324	340	328
Total.....	4,245	4,733	4,252

Meals eaten by men 12,238

Meals eaten by women (992 meals \times 0.8 meal of man) equivalent to 793

Total number of meals eaten..... 13,031

Equivalent to one man for four thousand three hundred and forty-four days.

Remarks.—This dietary study was intended not only (1) to show the kind and amount of food consumed by the students' club under ordinary conditions, but also (2) to serve as a basis of comparison for the other studies.

TABLE 4.—Food materials and table and kitchen wastes in dietary No. 148.

Kind of food material.	Composition.			Total cost.	Weight used.			
	Protein.	Fat.	Carbohydrates.		Total food material.	Protein.	Fat.	Carbohydrates.
ANIMAL FOOD.								
Beef:								
Sides	Per et.	Per et.	Per et.		Grams.	Grams.	Grams.	Grams.
Sides	14.5	16.8	.....	\$134.60	763,140	110,655	128,208	.....
Pressed, cooked.....	26.6	27.7	.....		17,555	4,669	4,862	.....
Total				134.60	780,695	115,324	133,070	.....
Veal, sides.....	15.1	6.3	.....	18.84	106,825	16,130	6,730	.....
Mutton:								
Sides	12.7	24.6	.....	30.60	154,225	19,586	37,939	.....
Cooked lamb.....	22.1	29.4	.....		1,815	401	533	.....
Total				30.60	156,040	19,987	38,472	.....
Pork:								
Shoulders and ribs.....	12.1	23.1	.....	21.10	106,370	12,881	24,571	.....
Ribs, cooked.....	26.5	37.7	.....		4,990	1,322	1,881	.....
Bacon	9.2	61.8	.....	21.73	93,895	8,638	58,027	.....
Bacon, cooked.....	16.7	56.0	.....		13,976	2,333	7,823	.....
Salt, fat	1.4	84.6	.....	15.00	90,720	1,270	76,749	.....
Lard.....		96.1	.....	19.22	112,495		108,105	.....
Total				77.05	422,440	26,444	277,156	.....
Poultry:								
Chicken	13.4	10.2	.....	12.18	368,325	49,355	37,569	.....
Turkey	15.7	18.4	.....	22.48	63,730	10,005	11,725	.....
Total				34.66	432,055	59,360	49,294	.....
Fish:								
Cod, fresh	17.8	1.4	.....	4.97	64,410	11,465	902	.....
Cod, salt	27.6	.7	.....	4.44	33,565	9,204	235	.....
Haddock	8.2	.2	.....	2.22	33,565	2,752	67	.....
Halibut	17.2	8.9	.....	7.32	27,670	4,759	2,463	.....
Halibut, cooked.....	17.1	8.9	.....		4,080	698	363	.....
Shad	18.1	8.2	.....	4.80	27,215	4,926	2,251	.....
Clams, shelled	10.6	1.1	5.2	4.16	23,585	2,500	259	1,227
Oysters.....	5.7	.9	1.6	30.78	116,359	6,631	1,047	1,862
Total				58.69	330,440	42,995	7,587	3,089

TABLE 4.—Food materials and table and kitchen wastes in dietary No. 148—Continued.

Kind of food material.	Composition.			Total cost.	Total food material.	Weight used.		
	Protein.	Fat.	Carbohydrates.			Protein.	Fat.	Carbohydrates.
ANIMAL FOOD—continued.								
Eggs, without shells	15.6	10.5	—	\$66.28	229,515	35,804	24,099	—
Butter	2.3	81.4	—	124.45	225,755	5,192	183,765	—
Milk	3.2	4.1	5.4	174.30	3,953,125	126,500	162,078	213,469
Gelatine	88.3	.3	—	2.30	1,045	921	3	—
Total animal food	—	—	—	721.77	6,637,935	448,657	882,254	216,558
VEGETABLE FOOD.								
Cereals, sugars, etc.:								
Corn meal	8.0	2.6	76.3	2.53	65,545	5,244	1,704	59,011
Hominy	6.8	.5	80.3	5.49	27,670	1,883	138	22,227
Flour, wheat	10.7	1.0	76.6	67.42	1,528,935	163,596	15,289	1,171,164
Flour, graham	14.1	1.5	71.9	1.19	30,845	4,340	463	22,178
Oats, rolled	17.7	6.2	68.1	5.16	49,215	8,711	3,051	33,516
Rice	9.1	.7	76.7	.32	2,270	207	16	1,741
Bread, brown	5.0	2.4	50.7	—	40,690	2,034	977	20,629
Cake, frosted	6.2	9.4	64.3	—	2,270	111	214	1,458
Cookies, molasses	6.5	9.5	76.9	—	680	44	65	523
Cookies, sugar	6.7	8.8	75.5	—	905	61	80	685
Crackers	10.2	12.3	71.1	34.85	263,540	26,881	32,415	187,377
Macaroni	12.6	.4	74.9	2.30	10,435	1,314	42	7,814
Pie, cream	5.6	8.1	55.7	—	1,000	56	81	556
Pie, mince	6.5	12.1	37.2	—	4,990	324	604	1,856
Pie, squash	4.4	8.4	21.7	—	22,225	978	1,867	4,823
Cornstarch . . . . .	.1	—	85.9	.56	3,175	—	3	2,727
Tapioca . . . . .	.5	4	86.6	.48	3,630	20	14	3,142
Chocolate	12.5	47.1	26.8	1.80	2,270	283	1,068	608
Sugar	—	—	100.0	108.49	1,093,630	—	—	1,093,629
Molasses	—	—	73.0	11.36	202,080	—	—	147,618
Maple sirup	—	—	70.1	63.76	321,375	—	—	225,284
Total	—	—	—	305.71	3,677,375	216,126	58,091	2,909,566
Vegetables:								
Beans	22.2	1.6	58.2	8.08	104,780	23,262	1,677	60,983
Beans, cooked	8.1	6.7	23.2	—	9,525	772	639	2,210
Beets	1.7	.1	9.8	1.97	111,585	1,887	112	10,936
Cabbage	1.4	.1	6.5	4.96	112,495	1,575	112	7,312
Carrots	1.3	.3	13.8	.05	2,270	29	7	313
Onions	4.4	.4	8.8	1.64	37,195	1,637	149	3,266
Parsnips	1.5	.8	16.7	1.00	22,680	340	182	3,788
Peas	25.2	1.3	62.6	.27	4,535	1,143	59	2,839
Peas, canned	4.4	.4	12.3	9.94	56,020	2,465	224	6,890
Potatoes, edible portion . .	2.4	.1	22.0	25.30	1,425,715	34,217	1,426	313,657
Potatoes, cooked	2.9	.4	25.5	—	11,115	322	44	2,834
Pumpkin, canned	1.2	.3	8.5	1.68	20,050	241	54	1,708
Salad	15.6	7.6	5.4	—	1,360	215	103	73
Squash, green	3.0	1.1	13.0	6.80	123,380	3,701	1,357	16,039
Squash, canned	1.2	.8	8.9	1.74	23,680	284	189	2,111
Tomatoes, canned	1.0	.2	3.2	2.28	24,495	245	49	784
Turnips	3.0	.3	17.4	3.49	226,345	6,790	679	39,384
Horse-radish	1.2	.2	9.6	3.42	10,660	128	21	1,023
Catsup	2.0	.4	16.1	2.51	5,985	120	24	964
Pickles, cucumber . . . . .	.5	.5	5.4	3.12	22,680	113	113	1,225
Total	—	—	—	78.25	2,356,550	79,496	7,220	478,339
Fruit:								
Apples, evaporated	1.3	3.2	55.7	1.84	10,435	136	334	5,812
Apricots, dried	3.1	2.2	72.0	1.50	6,805	211	150	4,911
Crab apples, canned . . . . .	.3	2.4	54.3	3.55	32,205	97	773	17,487
Blackberries, canned . . . . .	.8	2.1	56.4	2.30	10,435	83	219	5,885
Blueberries, canned . . . . .	.6	.6	13.0	4.32	26,170	157	157	3,402
Currants, dried	1.3	2.9	65.7	.91	6,350	83	184	4,172
Lemons, whole	1.9	.7	11.0	2.56	25,855	491	181	2,844
Oranges, whole	1.3	.6	13.7	4.00	45,360	500	272	6,214
Pineapples, canned . . . . .	.4	.7	36.4	2.44	9,980	40	70	3,639
Prunes	3.3	3.2	66.4	2.09	11,340	374	362	7,530
Prunes, cooked	2.0	2.0	41.9	—	1,360	27	27	570
Raisins	2.5	4.8	74.7	2.30	20,865	522	1,002	15,586
Total	—	—	—	27.81	207,160	2,811	3,731	78,042
Total vegetable food	—	—	—	411.77	6,241,085	298,433	69,042	3,555,947
Total food	—	—	—	1,133.54	12,879,020	747,090	951,296	3,772,505

TABLE 4.—*Food materials and table and kitchen wastes in dietary No. 148—Continued.*

Kind of food material.	Composition.			Total cost.	Weight used.				
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.			
						Protein.	Fat.	Carbohydrates.	
COOKED FOOD NOT EATEN.									
Animal food (roast beef).....	29.7	24.9	Per cent.		Grams. 39,915	Grams. 11,855	Grams. 9,939	Grams.	
Vegetable food:									
Flour, bread	6.9	.9	72.7	.....	3,400	235	32	2,472
Apple pie.....	6.3	9.8	41.7	.....	5,670	187	556	2,364
Fruit cake.....	6.2	10.4	64.8	.....	2,950	183	307	1,912
Sponge cake.....	6.5	9.6	70.3	.....	10,885	708	1,045	7,652
Doughnuts.....	6.7	21.9	54.3	.....	9,070	608	1,986	4,925
Pudding, tapioca	3.6	3.7	30.0	.....	17,235	620	638	5,171
Total cereals, sugars, and starches.....					49,210	2,541	4,564	24,496	
Vegetable hash.....	6.0	1.9	9.4	.....	8,165	490	155	767
Mince-meat.....	4.7	7.3	28.6	.....	46,720	2,196	3,410	13,362
Total					54,885	2,686	3,565	14,129	
Total animal food.....					39,915	11,855	9,939	.....
Total vegetable food.....					104,095	5,227	8,129	38,625	
Total food					144,010	17,082	18,068	38,625	
WASTE.									
Animal.....						117,509	287,195	.....
Vegetable.....						38,983	8,552	474,919	
Total						156,492	295,747	474,919	

TABLE 5.—*Weights and percentages of food materials and nutritive ingredients used in dietary No. 148.*

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
FOR CLUB, 58 DAYS.										
Beef, veal, and mutton	1,003,645	139,586	168,333	.....	2,215	308	371	.....	\$184.04
Pork, lard, etc.....	422,440	26,444	277,156	.....	931	58	611	.....	77.05
Poultry.....	432,055	59,360	49,294	.....	953	131	109	.....	34.66
Fish, etc.....	330,440	42,995	7,587	3,080	728	95	17	7	58.69	
Eggs.....	229,515	35,804	24,099	.....	506	79	53	.....	66.23
Butter.....	225,755	5,192	183,765	.....	498	11	405	.....	124.45
Milk.....	3,953,125	126,500	162,078	213,469	8,715	279	358	471	174.30	
Gelatine	1,045	921	3	.....	2	2	.....	.....	2.30
Total animal food.....	6,598,020	436,802	872,315	216,558	14,548	963	1,924	478	721.77	
Cereals, sugars, starches.....	3,628,165	213,585	53,527	2,975,070	8,000	471	118	6,559	305.71	
Vegetables.....	2,301,665	76,810	3,655	464,210	5,074	169	8	1,024	78.25	
Fruits.....	207,160	2,811	3,731	78,042	456	6	8	172	27.81	
Total vegetable food.....	6,136,990	293,206	60,913	3,517,322	13,530	646	134	7,755	411.77	
Total food.....	12,735,010	730,008	933,228	3,733,880	28,078	1,609	2,058	8,233	1,133.54	
PER MAN PER DAY.										
Beef, veal, and mutton	231	33	39	.....	0.51	0.08	0.09	.....	.....
Pork, lard, etc.....	98	6	64	.....	.22	.01	.14	.....	.....
Poultry.....	100	14	11	.....	.22	.03	.03	.....	.....
Fish, etc	77	10	2	1	.17	.02	.....	.....	.....

TABLE 5.—Weights and percentages of food materials and nutritive ingredients used in dietary No. 148—Continued.

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
PER MAN PER DAY—continued.										
Eggs.....	53	8	6	.....	0.12	0.02	0.01	.....	.....
Butter.....	52	1	43	.....	.11	.....	.10	.....	.....
Milk.....	910	29	37	49	2.02	.06	.08	0.11	.....
Total animal food.....	1,521	101	202	50	3.37	.22	.45	.11	\$0.17	
Cereals, sugars, starches.....	835	49	12	685	1.86	.11	.03	1.52	.....
Vegetables.....	530	18	1	108	1.18	.04	.....	.24	.....
Fruits.....	48	1	1	18	.10	.....	.....	.04	.....
Total vegetable food.....	1,413	68	14	811	3.14	.15	.03	1.80	.09	
Total food.....	2,934	169	216	861	6.51	.37	.48	1.91	.26	
PERCENTAGES OF TOTAL FOOD.										
Beef, veal, and mutton	Per cent.	Per cent.	Per cent.	Per cent.					Per ct.	
Pork, lard, etc.....	7.9	19.1	18.0	.....	.....	.....	.....	.....	16.2
Poultry.....	3.3	3.6	29.7	.....	.....	.....	.....	.....	6.8
Fish, etc.....	3.4	8.1	5.3	.....	.....	.....	.....	.....	3.1
Eggs.....	2.6	5.9	.8	0.1	.....	.....	.....	.....	5.2
Butter.....	1.8	4.9	2.6	.....	.....	.....	.....	.....	5.8
Milk.....	31.0	17.3	17.4	5.7	.....	.....	.....	.....	11.0
Gelatine.....		.1	.....	.....	.....	.....	.....	.....	.2
Total animal food.....	51.8	59.8	93.5	5.8	.....	.....	.....	.....	63.7
Cereals, sugars, starches.....	28.5	29.3	5.7	79.7	.....	.....	.....	.....	27.0
Vegetables.....	18.1	10.5	.4	12.4	.....	.....	.....	.....	6.9
Fruits.....	1.6	.4	.4	2.1	.....	.....	.....	.....	2.4
Total vegetable food.....	48.2	40.2	6.5	94.2	.....	.....	.....	.....	36.3
Total food.....	100.0	100.0	100.0	100.0	.....	.....	.....	.....	100.0

TABLE 6.—Nutrients and potential energy in food purchased, rejected, and eaten in dietary No. 148.

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohydrates.	
Food purchased:					
Animal.....	\$721.77	Grams.	Grams.	Grams.	Calories.
Vegetable.....	411.77	436,802	872,315	216,558	10,791,300
Total.....	1,133.54	293,206	60,913	3,517,322	16,189,700
Waste:					
Animal.....		117,509	287,195	.....	3,152,700
Vegetable.....		38,983	8,552	474,919	2,186,500
Total.....		156,492	295,747	474,919	5,339,200
Food actually eaten:					
Animal.....		319,293	585,120	216,558	7,638,600
Vegetable.....		254,223	52,361	3,042,403	14,003,200
Total.....		573,516	637,481	3,258,961	21,641,800

TABLE 6.—*Nutrients and potential energy in food purchased, rejected, etc.*—Continued.

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohy- drates.	
PER MAN PER DAY.					
Food purchased:					
Animal.....	\$0.17	Grams.	Grams.	Grams.	Calories.
Vegetable.....	.09	100	201	50	2,485
Total.....	.26	168	215	860	6,215
Waste:					
Animal.....		27	66		725
Vegetable.....		9	2	109	500
Total.....		36	68	109	1,225
Food actually eaten:					
Animal.....		73	135	50	1,760
Vegetable.....		59	12	701	3,230
Total.....		132	147	751	4,990
PERCENTAGES OF TOTAL FOOD PURCHASED.					
Food purchased:		Per ct.	Per cent.	Per cent.	Per cent.
Animal.....	63.7	59.8	93.5	5.8	40.0
Vegetable.....	36.3	40.2	6.5	94.2	60.0
Total.....	100.0	100.0	100.0	100.0	100.0
Waste:					
Animal.....		16.1	30.8		11.7
Vegetable.....		5.3	.9	12.7	8.1
Total.....		21.4	31.7	12.7	19.8
Food actually eaten:					
Animal.....		43.7	62.7	5.8	28.3
Vegetable.....		34.9	5.6	81.5	51.9
Total.....		78.6	68.3	87.3	80.2

STUDY OF A DIETARY CONTAINING EXPENSIVE PROTEIN.

In the second dietary study of this series changes were made in the ordinary diet. Protein was supplied from expensive sources, namely, high-priced meats, fish, and poultry, with a view to determining the effect on the amount and cost of the nutrients actually consumed. Milk was served only once a day, and cheap nitrogenous foods, like beans, were used in small amounts.

SECOND DIETARY STUDY OF THE COLLEGE CLUB AT MAINE STATE COLLEGE (No. 149).

[Protein from expensive sources—i. e., high-priced meats, fish, and poultry.]

The study began April 24 and continued twenty-six days.

The number of meals taken were as follows:

	Break- fasts.	Dinners.	Suppers.
Men.....		1,266	1,429
Women.....		125	134
Total.....	1,391	1,563	1,444
Meals eaten by men.....			4,011
Meals eaten by women (387 meals \times 0.8 meal of man) equivalent to.....			310
Total number of meals eaten.....			4,321
Equivalent to one man for one thousand four hundred and forty days.			

Remarks.—On April 24 an account was taken of the raw materials and cooked food on hand. The matron was then given the following instructions:

Select animal food so far as possible from the following sources: Hind quarter of beef, lamb, veal, chicken, eggs, halibut, salmon, shad, and lobster.

During this period it is desirable that milk shall be served but once a day, and that meats shall be used as freely as practicable, not only for dinner, but also for breakfast and supper. It is desired that meats shall be consumed in this period as freely as is consistent with health, with a consequent diminishing of cereals and vegetable foods.

Beans need not be served during this period unless in order to satisfy the boarders.

TABLE 7.—*Food materials and table and kitchen wastes in dietary No. 149.*

Kind of food material.	Composition.			Total cost.	Total food material.	Weight used.				
	Protein.	Fat.	Carbo-hydrates.			Nutrients.				
						Per. ct.	Per. ct.	Per. ct.		
ANIMAL FOOD.										
Beef, hind quarter.....	14.9	17.5	.....	\$89.97	388,735	Grams.	Grams.	Grams.	
Veal, sides.....	15.1	6.3	.....	11.60	65,770	57,921	68,029	.....	
Mutton, sides.....	12.7	24.6	.....	8.35	42,095	9,931	4,144	.....	
Pork:										
Bacon.....	9.2	61.8	.....	9.97	43,090	3,964	26,631	.....	
Salt, fat.....	1.4	84.6	.....	3.92	23,700	332	20,050	.....	
Lard.....		96.1	.....	7.11	41,640	.....	40,016	.....	
Total.....	13.4	10.2	.....	21.00	108,430	4,296	86,697	.....	
Poultry, fowl.....				33.22	100,470	13,463	10,248	.....	
Fish, etc.:										
Bluefish.....	9.8	.6	.....	2.31	17,465	1,711	105	.....	
Cod, fresh.....	17.8	1.4	.....	1.75	22,680	4,037	317	.....	
Halibut.....	17.1	8.9	.....	11.10	41,960	7,175	3,734	.....	
Shad.....	18.1	8.2	.....	4.08	23,135	1,187	1,897	.....	
Lobster, edible portion.....	25.4	2.0	.....	13.16	21,320	5,415	426	.....	
Total.....				32.40	126,560	22,525	6,479	.....	
Eggs, no shells.....	15.5	10.5	.....	46.21	160,310	24,348	16,833	.....	
Butter.....	2.3	81.4	.....	65.15	118,435	2,724	96,406	.....	
Milk.....	3.2	4.1	5.4	51.41	1,165,750	37,304	47,796	62,951		
Mince-meat.....	4.7	7.3	28.6	.....	46,720	2,196	3,411	13,362	
Total animal food.....				359.31	2,323,275	180,554	350,398	76,313		
VEGETABLE FOOD.										
Cereals, sugars, etc.:										
Corn meal.....	8.0	2.6	76.3	.91	23,585	1,887	613	17,997		
Hominy.....	6.8	.5	80.3	.81	4,080	278	20	3,278		
Flour, wheat.....	10.7	1.0	76.6	13.70	310,720	33,247	3,107	238,012		
Flour, graham.....	14.1	1.5	71.9	2.80	7,260	1,023	109	5,219		
Oats, rolled.....	17.7	6.2	68.1	2.80	26,760	4,737	1,659	18,225		
Rice.....	9.1	.7	76.7	.26	1,815	165	13	1,391		
Bread, wheat.....	6.9	.9	72.7	.....	5,170	357	47	3,758	
Crackers.....	10.2	12.3	71.1	2.40	18,145	1,850	2,232	12,900		
Doughnuts.....	6.7	21.9	54.3	.....	14,970	1,003	3,278	8,128	
Macaroni.....	12.6	.4	74.9	.40	1,815	229	7	1,359		
Cornstarch.....	.1	85.9	.56	.....	3,175	.....	3	2,727
Tapioca.....	.5	.4	86.6	.12	905	5	3	784		
Sugar.....		100.0	22.50	.....	226,800	.....	.....	226,800
Molasses.....			73.0	5.75	102,285	.....	.....	74,668
Maple sirup.....			70.1	5.08	25,630	.....	.....	17,967
Total.....				58.09	773,115	44,781	11,091	633,213		
Vegetables:										
Beans.....	22.2	1.6	58.2	2.45	31,750	7,049	508	18,478		
Beets.....	1.7	.1	9.8	1.18	67,135	1,141	67	6,579		
Carrots.....	1.3	.3	13.8	.07	3,175	41	10	438		

TABLE 7.—Food materials and table and kitchen wastes in dietary No. 149—Continued.

Kind of food material.	Composition.			Total cost.	Weight used.			
	Protein.	Fat.	Carbo-hydrates.		Total food material.	Nutrients.		
						Protein.	Fat.	
VEGETABLE FOOD—continued.								
Vegetables—Continued.	Per ct.	Per ct.	Per ct.		Grams.	Grams.	Grams.	
Sweet corn, canned	2.8	1.2	15.9	\$18.42	111,405	3,119	1,337	
Lettuce	1.3	.2	4.9	.52	3,400	44	7	
Parsnips	1.5	.8	16.7	2.00	45,360	680	363	
Peas	25.2	1.3	62.6	.37	6,350	1,600	83	
Peas, canned	4.4	.4	12.3	7.30	41,505	1,826	166	
Potatoes	2.4	.1	22.0	8.19	445,890	10,701	446	
Potatoes, cooked	2.9	.4	25.5	-----	6,350	184	25	
Pumpkins, canned	1.1	.3	8.5	.84	9,980	110	30	
Squash, green	3.0	1.1	13.0	3.14	58,060	1,742	639	
Squash, canned	1.2	.8	8.9	1.50	20,410	245	163	
Tomatoes	1.0	.2	3.1	4.38	46,720	467	93	
Catsup	2.0	.5	16.1	5.26	12,565	251	63	
Horse-radish	1.2	.2	9.6	2.77	8,390	100	17	
Total	-----	-----	-----	58.45	918,445	29,300	4,017	
Fruit:								
Apples . . . . .	.3	.2	17.9	.33	9,980	30	20
Apples, evaporated	1.2	3.2	55.7	3.36	19,050	229	609	
Apricots, dried	3.1	2.2	71.9	5.00	22,680	703	499	
Bananas	1.2	1.0	16.6	.76	12,700	152	127	
Blackberries, canned . . . . .	.8	2.1	56.3	2.20	9,980	80	210
Blueberries, canned . . . . .	.6	.6	13.0	1.63	9,845	59	1,280
Lemons	1.9	.7	11.0	2.85	28,715	546	201	
Prunes	3.3	3.2	66.4	1.20	6,805	225	218	
Raisins	2.5	4.8	74.7	.50	4,535	113	218	
Total	-----	-----	-----	17.83	124,290	2,137	2,161	
Total vegetable food	-----	-----	-----	134.37	1,815,850	76,218	17,269	
Total food	-----	-----	-----	493.68	4,139,125	256,772	367,667	
COOKED FOOD NOT EATEN.								
Animal food:								
Pressed beef	26.6	27.7	-----	-----	4,080	1,085	1,130	
Roast beef	29.7	24.9	-----	-----	6,575	1,953	1,637	
Total	-----	-----	-----	-----	10,655	3,038	2,767	
Vegetable food:								
Custard pie	4.2	6.8	25.6	-----	18,145	762	1,234	
Apple pie	3.3	9.8	41.7	-----	8,845	292	867	
Mince pie	6.5	12.1	37.2	-----	5,895	383	713	
Cream pie	5.6	8.1	55.7	-----	2,040	114	165	
Johnnycake	8.5	2.7	47.3	-----	48,535	4,125	1,311	
Fruit	6.2	10.4	64.8	-----	905	56	94	
Molasses cookies	6.5	9.5	76.9	-----	680	44	65	
Sugar	6.7	8.8	75.5	-----	2,495	167	220	
Total cereals, sugars, etc.	-----	-----	-----	-----	87,540	5,943	4,669	
Apricot sauce	1.9	1.3	48.8	-----	9,980	190	130	
Total animal food	-----	-----	-----	-----	10,655	3,038	2,767	
Total vegetable food	-----	-----	-----	-----	97,520	6,133	4,799	
Total food	-----	-----	-----	-----	108,175	9,171	7,566	
WASTE.								
Animal	-----	-----	-----	-----	72,429	121,968	-----	
Vegetable	-----	-----	-----	-----	13,483	2,318	144,880	
Total	-----	-----	-----	-----	85,912	124,286	144,880	

TABLE 8.—Weights and percentages of food materials and nutritive ingredients used in dietary No. 149.

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
FOR CLUB, 26 DAYS.										
Beef, veal, and mutton.	485, 945	70, 160	79, 761	.....	1, 072	154	176	.....	\$109.92
Pork, lard, etc.	108, 430	4, 296	88, 697	.....	239	9	191	.....	21.00
Poultry	100, 470	13, 463	10, 248	.....	221	30	23	.....	33.22
Fish, etc.	126, 560	22, 525	6, 479	.....	279	50	14	.....	32.40
Eggs	160, 310	24, 848	16, 833	.....	353	55	37	.....	46.21
Butter	118, 435	2, 724	96, 406	.....	261	6	213	.....	65.15
Milk	1, 165, 750	37, 304	47, 796	62, 951	2, 570	82	105	139	51.41	
Mince-meat	46, 720	2, 196	3, 411	13, 362	103	5	7	29	.....
Total animal food	2, 312, 620	177, 516	347, 631	76, 313	5, 098	391	766	168	359.31	
Cereals, sugars, starches.										
Cereals	685, 575	38, 838	6, 422	595, 603	1, 512	86	14	1, 313	58.09	
Vegetables	918, 445	29, 300	4, 017	174, 234	2, 025	65	9	384	58.45	
Fruits	114, 310	1, 947	2, 031	43, 905	252	4	5	97	17.83	
Total vegetable food	1, 718, 330	70, 085	12, 470	813, 742	3, 789	155	28	1, 794	134.37	
Total food	4, 030, 950	247, 601	360, 101	890, 055	8, 887	546	794	1, 962	493.68	
PER MAN PER DAY.										
Beef, veal, and mutton.	337	49	56	.....	0.75	0.11	0.12	.....	.....
Pork, lard, etc.	76	3	61	.....	.17	.01	.14	.....	.....
Poultry	71	9	7	.....	.16	.02	.02	.....	.....
Fish, etc.	89	16	5	.....	.19	.03	.01	.....	.....
Eggs	112	17	12	.....	.25	.04	.03	.....	.....
Butter	83	2	68	.....	.18	.....	.15	.....	.....
Milk	810	26	33	44	1.80	.06	.07	0.10	.....
Mince-meat	33	2	2	9	.07	.....	.02	.....	.....
Total animal food	1, 611	124	244	53	3.57	.27	.54	.12	.25	
Cereals, sugars, starches.										
Cereals	476	27	4	414	1.06	.06	.01	.92	.....
Vegetables	638	21	3	122	1.42	.05	.01	.27	.....
Fruits	80	1	1	31	.18	.....	.....	.07	.....
Total vegetable food	1, 194	49	8	567	2.66	.11	.02	1.26	.10	
Total food	2, 805	173	252	620	6.23	.38	.56	1.38	.35	
PERCENTAGES OF TOTAL FOOD.										
Beef, veal, and mutton.	12.1	28.3	22.1	.....	.....	.....	.....	.....	Per cent.
Pork, lard, etc.	2.7	1.7	24.1	.....	.....	.....	.....	.....	22.2
Poultry	2.5	5.5	2.8	.....	.....	.....	.....	.....	4.3
Fish, etc.	3.1	9.1	1.8	.....	.....	.....	.....	.....	6.7
Eggs	4.0	10.0	4.7	.....	.....	.....	.....	.....	6.6
Butter	2.9	1.1	26.8	.....	.....	.....	.....	.....	9.4
Milk	28.9	15.1	13.3	7.1	.....	.....	.....	.....	13.2
Mince-meat	1.2	.9	.9	1.5	.....	.....	.....	.....	10.4
Total animal food	57.4	71.7	96.5	8.6	.....	.....	.....	.....	72.8
Cereals, sugars, starches.										
Cereals	17.0	15.7	1.8	66.9	.....	.....	.....	.....	11.8
Vegetables	22.8	11.8	1.1	19.6	.....	.....	.....	.....	11.8
Fruits	2.8	.8	.6	4.9	.....	.....	.....	.....	3.6
Total vegetable food	42.6	28.3	3.5	91.4	.....	.....	.....	.....	27.2
Total food	100.0	100.0	100.0	100.0	.....	.....	.....	.....	100.0

TABLE 9.—*Nutrients and potential energy in food purchased, rejected, and eaten in dietary No. 149.*

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohy. drates.	
Food purchased:					
Animal	\$359.31	Grams.	Grams.	Grams.	Calories.
Vegetable	134.37	177,516	347,631	76,313	4,273,700
Total.....	493.68	247,601	360,101	890,055	8,013,300
Waste:					
Animal		72,429	121,968	.....	1,431,300
Vegetable		13,483	2,318	144,880	670,800
Total.....		85,912	124,286	144,880	2,102,100
Food actually eaten:					
Animal		105,087	225,663	76,313	2,842,400
Vegetable.....		56,602	10,152	668,862	3,068,800
Total.....		161,689	235,815	745,175	5,911,200
PER MAN PER DAY.					
Food purchased:					
Animal .....	.25	123	242	53	2,975
Vegetable.....	.09	49	8	565	2,590
Total.....	.34	172	250	618	5,565
Waste:					
Animal		51	84	.....	990
Vegetable		9	2	101	470
Total.....		60	86	101	1,460
Food actually eaten:					
Animal		72	158	53	1,985
Vegetable.....		40	6	464	2,120
Total.....		112	164	517	4,105
PERCENTAGES OF TOTAL FOOD PURCHASED.					
Food purchased:		Per cent.	Per cent.	Per cent.	Per cent.
Animal	72.8	71.7	96.5	8.6	53.3
Vegetable.....	27.2	28.3	3.5	91.4	46.7
Total.....	100.0	100.0	100.0	100.0	100.0
Waste:					
Animal		29.3	33.9	.....	17.8
Vegetable		5.4	.6	16.3	8.4
Total.....		34.7	34.5	16.3	26.2
Food actually eaten:					
Animal		42.4	62.6	8.6	35.5
Vegetable.....		22.9	2.9	75.1	38.3
Total.....		65.3	65.5	83.7	73.8

STUDY OF A DIETARY CONTAINING CHEAP PROTEIN.

In the third dietary study of this series the ordinary diet was changed to one containing protein supplied from cheap sources, including low-priced meats and beans. Milk was supplied very liberally, and beans were served as often as twice a week. The diet was so arranged that the supply of meats as compared with that of bread and vegetables was less than in the second study (No. 149).

THIRD DIETARY STUDY OF THE COLLEGE CLUB AT MAINE STATE COLLEGE (No. 150).

[Protein from cheaper sources—i. e., low-priced meats, milk, and beans.]

The study began May 20 and continued twenty-seven days.

The number of meals taken was as follows:

	Break- fasts.	Dinners.	Suppers.
Men	1,356	1,583	1,515
Women	135	146	137
Total	1,491	1,729	1,652

Meals eaten by men 4,454

Meals eaten by women (418 meals \times 0.8 meal of man) equivalent to 334

Total number of meals eaten 4,788

Equivalent to one man for one thousand five hundred and ninety-six days.

Remarks.—The matron was given the following instructions:

Select animal food so far as possible from the following sources: Fore quarter of beef, fresh pork, ham, fresh cod, salt cod, and milk.

During this period furnish milk as freely as it is called for, three times a day if possible. Furnish beans freely, twice a week regularly, if practicable, and whenever called for. Plan for such dishes as will require milk in the cooking. Make a free use of bread.

It is desired in this period to make the relative supply of meats smaller as compared with the bread and vegetable supply than was the case in the second period.

TABLE 10.—*Food materials and table and kitchen wastes in dietary No. 150.*

Kind of food material.	Composition.			Total cost.	Weight used.				
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.			
						Protein.	Fat.	Carbohydrates.	
ANIMAL FOOD.									
Beef:									
Fore quarter	Per ct.	Per ct.	Per ct.		Grams.	Grams.	Grams.	Grams.	
Fore quarter	14.1	17.3	-----	\$21.89	180,535	25,455	31,232	-----	
Pressed, cooked	26.6	27.7	-----		4,080	1,086	1,131	-----	
Corned	13.9	23.9	-----	2.40	13,610	1,891	3,252	-----	
Tripe, pickled	11.9	.9	-----	1.50	18,145	2,159	163	-----	
Total	-----	-----	-----	25.79	216,370	30,591	35,778	-----	
Pork:									
Roast	12.1	23.1	-----	23.49	118,390	14,325	27,348	-----	
Ham	13.3	33.4	-----	22.47	97,070	12,910	32,421	-----	
Bacon	9.2	61.8	-----	2.20	9,525	876	5,886	-----	
Salt, fat	1.4	84.6	-----	7.20	43,545	610	36,839	-----	
Lard	96.1	-----	-----	1.80	10,525	-----	10,136	-----	
Total	-----	-----	-----	57.16	279,055	28,721	112,630	-----	
Fish:									
Cod, fresh	17.8	1.3	-----	1.75	22,680	4,037	295	-----	
Cod, salt	27.6	.7	-----	8.28	62,595	17,277	438	-----	
Salmon, fresh	19.8	8.4	-----	12.87	23,360	4,626	1,963	-----	
Total	-----	-----	-----	22.90	108,635	25,940	2,696	-----	
Eggs, without shell	15.5	10.5	-----	24.24	83,900	13,004	8,810	-----	
Butter	2.3	81.4	-----	64.26	116,615	2,682	94,925	-----	
Milk	3.2	4.1	5.4	84.20	1,909,655	61,109	78,316	103,121	
Total animal food	-----	-----	-----	278.55	2,714,230	162,047	333,155	103,121	

TABLE 10.—Food materials and table and kitchen wastes in dietary No. 150—Continued.

Kind of food material.	Composition.			Weight used.				
	Protein.	Fat.	Carbohydrates.	Total cost.	Total food material.	Nutrients.		
						Protein.	Fat.	Carbohydrates.
VEGETABLE FOOD.								
Cereals, sugars, etc.:	Per ct.	Per ct.	Per ct.	Grams.	Grams.	Grams.	Grams.	
Corn meal.....	8.0	2.6	76.3	\$12.77	33,115	2,649	861	
Hominy.....	6.8	.5	80.3	.81	4,080	278	20	
Flour, wheat.....	10.7	1.0	76.6	19.57	443,930	47,501	4,439	
Flour, graham.....	14.1	1.5	71.9	.77	19,960	2,814	299	
Oats, rolled.....	17.7	6.2	68.1	2.85	27,215	4,817	1,687	
Cake, frosted.....	6.2	9.4	64.3	.....	905	56	85
Cake, sponge.....	6.5	9.6	70.3	.....	6,125	398	588
Cookies, molasses.....	6.5	9.5	76.9	.....	3,400	221	323
Cookies, sugar.....	6.7	8.8	75.5	.....	4,765	319	419
Crackers.....	10.2	12.3	71.1	1.80	13,610	1,388	1,674	
Pie, apple.....	3.3	9.8	41.7	.....	4,535	150	444
Pie, cream.....	5.6	8.1	55.7	.....	2,040	114	165
Pie, custard.....	4.2	6.8	25.6	.....	18,145	762	1,234
Pie, mince.....	6.5	12.1	37.2	.....	5,895	383	713
Pudding.....	3.6	3.7	30.0	.....	2,720	98	101
Cornstarch.....	.....	.1	85.9	.56	3,175	.....	3
Chocolate.....	12.5	47.1	26.8	1.08	1,360	170	641	
Sugar.....	.....	.....	100.0	24.54	248,825	.....	248,825
Molasses.....	.....	.....	73.0	4.35	77,340	.....	56,458
Maple sirup.....	.....	.....	70.1	8.37	42,185	.....	29,572
Total.....	.....	.....	.....	77.47	963,325	62,118	13,696
Vegetables:	.....	.....	.....	.....	.....	.....	.....
Beans.....	22.2	1.6	58.2	4.27	55,340	12,285	885	
Beets.....	1.7	.1	9.8	7.36	41,730	709	42	
Catsup.....	2.0	.5	16.1	3.23	7,710	154	39	
Greens, dandelions.....	2.4	1.0	10.6	.82	14,970	359	150	
Horse-radish.....	1.2	.2	9.6	.52	1,590	19	3	
Onions.....	4.4	.4	8.8	.20	4,535	200	18	
Parsnips.....	1.5	.8	16.7	.12	2,720	41	22	
Peas, canned.....	4.4	.4	12.3	2.78	15,650	689	62	
Potatoes.....	2.4	.1	22.0	8.02	433,640	10,407	434	
Pumpkin, canned.....	1.1	.3	8.5	1.18	14,060	155	42	
Rhubarb, fresh.....	.3	.1	2.9	4.20	95,255	286	95	
Squash, canned.....	1.2	.8	8.9	.80	10,885	131	87	
Tomatoes, canned.....	1.0	.2	3.1	3.47	37,195	372	74	
Turnips.....	3.0	.3	17.4	5.29	35,610	1,068	107	
Total.....	.....	.....	.....	42.26	770,890	26,875	2,060
Fruits:	.....	.....	.....	.....	.....	.....	.....
Apples, evaporated.....	1.2	3.2	55.7	2.88	15,875	190	508	
Apricot sauce.....	1.9	1.3	48.8	.....	9,980	190	130
Bananas, whole.....	1.2	1.0	16.6	.84	10,885	131	109	
Blueberries, canned.....	.6	.6	13.0	3.41	20,640	124	124	
Lemons, whole.....	1.9	.7	11.0	10.03	101,155	1,922	708	
Pineapple, whole.....	.4	.3	9.7	2.82	21,320	85	64	
Prunes.....	3.3	3.2	66.4	1.20	6,805	224	218	
Prunes, cooked.....	2.0	2.0	41.9	.....	5,895	118	118
Raisins.....	2.5	4.8	74.7	.25	2,270	57	109	
Total.....	.....	.....	.....	21.43	194,825	3,041	2,088
Total vegetable food.....	.....	.....	.....	141.16	1,929,040	92,034	17,844
Total food.....	.....	.....	.....	419.71	4,643,270	254,081	350,999
COOKED FOOD NOT EATEN.	.....	.....	.....	.....	.....	.....	.....
Animal food:	.....	.....	.....	.....	.....	.....	.....
Roast beef.....	29.7	24.9	.....	.....	10,205	3,031	2,541
Ham.....	14.0	34.6	.....	.....	6,805	952	2,355
Total animal food.....	.....	.....	.....	.....	17,010	3,983	4,896
Vegetable food:	.....	.....	.....	.....	.....	.....	.....
Blueberry pie.....	2.5	2.8	21.2	.....	680	17	19
Doughnuts.....	0.7	21.9	54.3	.....	6,350	425	1,391
Flour, bread.....	6.8	.9	72.7	.....	5,895	401	53
Total cereals, sugar, etc. ....	.....	.....	.....	.....	12,925	843	1,463

TABLE 10.—*Food materials and table and kitchen wastes in dietary No. 150—Continued.*

Kind of food material.	Composition.			Total cost.	Total food material.	Weight used.		
	Protein.	Fat.	Carbohydrates.			Protein.	Fat.	Carbohydrates.
	Per cent.	Per cent.	Per cent.			Grams.	Grams.	Grams.
COOKED FOOD NOT EATEN—cont'd.								
Vegetable food—Continued.								
Potatoes.....	2.9	0.4	25.5	.....	905	26	4	231
Rhubarb sauce .....	.9	.2	8.9	.....	9,070	82	18	807
Total vegetable.....					9,975	108	22	1,038
Apple sauce .....	.2	.9	37.2	.....	2,830	6	25	1,053
Total vegetable food.....					25,730	957	1,510	9,969
Total food					42,740	4,940	6,406	9,969
WASTE.								
Animal								
Vegetable.....						50,837	172,184	.....
Total						19,697	2,725	209,694
						70,534	174,909	209,694

TABLE 11.—*Weights and percentages of food materials and nutritive ingredients used in dietary No. 150.*

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
FOR CLUB, 27 DAYS.										
Beef, veal, and mutton.	206,165	27,560	33,237	.....	454	61	73	.....	\$25.79
Pork, lard, etc.....	272,250	27,769	110,275	.....	600	61	243	.....	57.16
Fish, etc.....	108,635	25,940	2,696	.....	240	57	6	.....	22.90
Eggs.....	83,900	13,004	8,810	.....	185	29	19	.....	24.24
Butter	116,615	2,682	94,925	.....	257	6	209	.....	64.26
Milk	1,909,635	61,109	78,316	103,121	4,210	135	173	227	84.20	
Total animal food	2,697,220	158,064	328,259	103,121	5,946	349	723	227	278.55	
Cereals, sugars, starches.....										
Vegetables.....	950,400	61,275	12,233	763,004	2,096	135	27	1,682	77.47	
Fruits.....	760,915	26,767	2,038	148,695	1,677	59	4	328	42.26	
Total vegetable food.....	191,995	3,035	2,063	39,029	423	7	5	88	21.43	
Total food.....	1,903,310	91,077	16,334	950,728	4,196	201	36	2,098	141.16	
PER MAN PER DAY.										
Beef, veal, and mutton.	130	17	21	.....	0.29	0.04	0.05	.....	.....
Pork, lard, etc.....	172	18	70	.....	.38	.04	.16	.....	.....
Fish, etc.....	69	16	2	.....	.15	.03	.....	.....	.....
Eggs.....	53	8	6	.....	.12	.02	.01	.....	.....
Butter	74	2	60	.....	.16	.....	.13	.....	.....
Milk	1,197	39	49	65	2.66	.09	.11	0.14	.....
Total animal food	1,695	100	208	65	3.76	.22	.46	.14	.18	
Cereals, sugars, starches.....										
Vegetables.....	595	39	8	478	1.32	.09	.02	1.07	.....
Fruits.....	477	17	1	94	1.06	.04	.....	.21	.....
Total vegetable food.....	1,193	58	10	597	2.65	.13	.02	1.33	.09	
Total food.....	2,888	158	218	662	6.41	.35	.48	1.47	.27	

TABLE 11.—Weights and percentages of food, etc., used in dietary No. 150—Continued.

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
PERCENTAGES OF TOTAL FOOD.										
Beef, veal, and mutton.	4.5	11.1	9.6						Per cent.	
Pork, lard, etc.	5.9	11.1	32.0						6.1	
Fish, etc.	2.4	10.4	.8						13.6	
Eggs	1.8	5.2	2.6						5.5	
Butter	2.5	1.1	27.6						5.8	
Milk	41.5	24.5	22.7	9.8					15.3	
Total animal food	58.6	63.4	95.3	9.8					20.1	
									66.4	
Cereals, sugars, starches.	20.7	24.6	3.5	72.3						
Vegetables	16.5	10.8	.6	14.1					18.4	
Fruits	4.2	1.2	.6	3.8					10.1	
Total vegetable food	41.4	36.6	4.7	90.2					5.1	
Total food	100.0	100.0	100.0	100.0					33.6	
									100.0	

TABLE 12.—Nutrients and potential energy in food purchased, rejected, and eaten in dietary No. 150.

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohydrates.	
Food purchased:					
Animal	\$278.55	Grams.	Grams.	Grams.	Calories.
Vegetable	141.16	158,064	328,259	103,121	4,123,700
Total	419.71	91,077	16,334	950,728	4,423,300
Waste:					
Animal		50,837	172,184		1,809,700
Vegetable		19,697	2,725	209,694	965,900
Total		70,534	174,909	209,694	2,775,600
Food actually eaten:					
Animal		107,227	156,075	103,121	2,314,000
Vegetable		71,380	13,609	741,034	3,457,400
Total		178,607	169,684	844,155	5,771,400
PER MAN PER DAY.					
Food purchased:					
Animal	.17	99	206	65	2,590
Vegetable	.09	57	10	596	2,770
Total	.26	156	216	661	5,360
Waste:					
Animal		32	108		1,135
Vegetable		12	2	131	605
Total		44	110	131	1,740
Food actually eaten:					
Animal		67	98	65	1,455
Vegetable		45	8	465	2,165
Total		112	106	530	3,620
PERCENTAGES OF TOTAL FOOD PURCHASED.					
Food purchased:					
Animal	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Vegetable	66.4	63.4	95.3	9.8	48.2
Total	33.6	36.6	4.7	90.2	51.8
	100.0	100.0	100.0	100.0	100.0

TABLE 12.—*Nutrients and potential energy in food purchased, rejected, etc.*—Continued.

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohy- drates.	
PERCENTAGES TOTAL FOOD PURCHASED—cont'd.					
Waste:	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Animal.....		20.4	50.0		21.2
Vegetable.....		7.9	.8	19.9	11.3
Total.....		28.3	50.8	19.9	32.5
Food actually eaten:					
Animal.....		43.0	45.3	9.8	27.0
Vegetable.....		28.7	3.9	70.3	40.5
Total.....		71.7	49.2	80.1	67.5

The reason for the division of animal foods which is made in the two dietaries Nos. 149 and 150 is evident from the following table, which shows the wide differences in the cost of the various animal foods included in the list:

TABLE 13.—*Cost of various animal foods.*

Food material.	Market cost per 100 pounds.	Edible dry matter per 100 pounds.	Cost of 1 pound of edible dry matter.
<i>More costly materials.</i>			
Hind quarter of beef.....	\$10.50	30.6	34.3
Mutton.....	9.00	37.8	23.8
Veal.....	8.00	21.4	37.4
Chicken.....	15.00	22.8	65.8
Eggs, without shells.....	13.10	26.0	50.4
Halibut.....	12.00	26.0	46.2
Salmon.....	25.00	31.4	79.6
Shad.....	8.00	24.3	32.9
Lobster, edible part.....	28.00	26.6	105.3
<i>Less costly materials.</i>			
Fore quarter of beef.....	5.50	30.4	18.1
Pork, shoulders and ribs.....	9.00	33.8	26.6
Ham.....	10.50	46.7	22.5
Bacon.....	10.50	71.0	14.8
Fresh cod.....	3.50	19.1	18.3
Salt cod.....	6.00	28.3	21.2
Milk.....	2.00	12.7	15.7

In dietaries Nos. 149 and 150 the waste from the animal food was not kept separate from the vegetable waste. Indeed, it was not possible to do this with entire accuracy. It is assumed, however, in calculating the proportion of waste from the two sources that all the carbohydrates of the refuse came from the vegetable foods, and that the protein and fat in the vegetable refuse bear the same proportion to the carbohydrates as in the foods themselves.

For each 100 pounds of carbohydrates in the vegetable foods purchased there were the following quantities of protein and fat:

Pounds of protein and fat per 100 pounds of carbohydrates in vegetable foods.

	Protein.	Fat
Dietary No. 148.....	Pounds.	Pounds.
Dietary No. 149.....	8.2	1.8
Dietary No. 150.....	9.3	1.6
	9.4	1.3

Using the preceding figures, the quantities of protein and fats in the total waste that properly belong to the vegetable foods have been calculated for dietaries Nos. 148, 149, and 150. The results are only approximate, but the error introduced is not sufficient to interfere with a correct interpretation of the results.

During the fourth and fifth studies the steward was instructed to separate the waste into three portions, viz, that from the cereal products, that from the vegetables, and that from the meats, and the animal and vegetable wastes were calculated from the data thus obtained. Of course such a separation is only approximate, because much cooked food is a mixture of two or all of these classes of raw materials.

STUDY OF A DIETARY CONTAINING A LIMITED MILK SUPPLY.

In the fourth dietary study of this series the meat and vegetable foods were selected as under ordinary conditions, and the amount of milk furnished was reduced to the minimum, with a view to determining the effect of a limited milk supply on the amount and cost of the nutrients actually consumed.

FOURTH DIETARY STUDY OF THE COLLEGE CLUB AT MAINE STATE COLLEGE (No. 151).

[Ordinary meats and a limited milk supply.]

The study began September 2 and continued forty-nine days.

The number of meals taken was as follows:

		Breakfasts.	Dinners.	Suppers.
Men				
Women		3,319 196	3,487 196	3,265 196
Total		3,511	3,679	3,457

Meals eaten by men 10,071

Meals eaten by women (588 meals \times 0.8 meal of man) equivalent to 470

Total number of meals 10,541

Equivalent to one man for three thousand five hundred and fourteen days.

Remarks.—The meats were selected as under ordinary conditions, and the supply of milk was limited as much as possible, the students being allowed milk only at supper.

TABLE 14.—*Food materials and table and kitchen wastes in dietary No. 151.*

Kind of food material.	Composition.			Total cost.	Weight used.				
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.			
						Protein.	Fat.	Carbohydrates.	
ANIMAL FOOD.									
Beef:									
Hindquarters	Per ct.	Per ct.	Per ct.	\$168.63	Grams.	Grams.	Grams.	Grams.	
Round	14.9	17.5	.....	.....	695.370	103.610	121.690	.....
Roast	18.1	12.6	.....	9.68	39.915	7.225	5.029	.....
Round steak	14.9	17.5	.....	6.08	17.235	2,568	3,016	.....
	18.1	12.6	.....	40	1,135	205	143	.....
Total	15.1	6.3	.....	184.79	753.655	113.608	129.878	.....
Veal	14.2	18.7	.....	11.20	63.505	9.589	4.001	.....
Mutton, lamb, side	35.20	159.665	22.672	29.857	.....	.....	.....	.....

TABLE 14.—Food materials and table and kitchen wastes in dietary No. 151—Cont'd.

Kind of food material.	Composition.			Weight used.				
	Protein.	Fat.	Carbohydrates.	Total cost.	Total food material.	Nutrients.		
				Per ct.	Per ct.	Per ct.	Grams.	Grams.
ANIMAL FOOD—continued.								
Pork:								
Backs.....	13.8	25.5	.....	\$11.16	56,245	7,762	14,342	.....
Chops.....	13.8	25.5	.....	6.20	28,125	3,881	7,172	.....
Hams, fresh.....	11.7	36.0	.....	5.25	23,810	2,786	8,572	.....
Hams, smoked.....	13.3	33.4	.....	19.32	83,460	11,100	27,876	.....
Lard.....		95.7	.....	26.19	153,315		146,722	.....
Salt pork.....	2.7	80.3	.....	9.22	55,795	1,506	44,803	.....
Total				77.34	400,750	27,035	249,487	.....
Poultry, chicken.....	13.4	10.2	.....	16.80	32,660	4,376	3,332	.....
Fish, etc.:								
Bluefish.....	9.8	.6	.....	3.00	22,680	2,223	136	.....
Cod, fresh.....	18.1	.2	.....	2.34	30,390	5,501	61	.....
Halibut.....	16.4	8.4	.....	20.58	77,790	12,758	6,534	.....
Oysters.....	4.5	.5	1.5	21.60	81,050	3,674	408	1,225
Total				47.52	212,510	24,156	7,139	,225
Eggs, no shell.....	15.5	10.8	.....	48.55	160,420	26,260	18,297	.....
Butter.....	2.1	81.5	.....	129.75	235,420	4,944	191,867	.....
Milk.....	3.2	3.5	5.2	135.10	3,064,070	98,050	107,242	159,332
Cream.....	3.7	17.5	2.8	.60	2,270	84	397	64
Total animal food.....				686.85	5,093,925	330,774	741,497	160,621
VEGETABLE FOOD.								
Cereals, sugars, and starches:								
Chocolate.....	13.4	50.2	33.8	2.16	2,720	364	1,365	919
Corn meal.....	8.7	1.5	77.6	1.31	34,020	2,960	510	26,400
Cornstarch.....		.1	85.9	.64	3,630		4	3,118
Crackers, butter.....	10.3	13.6	71.3	5.64	42,640	4,392	5,799	30,402
Crackers, oyster.....	9.8	12.2	69.1	5.64	42,640	4,179	5,202	29,464
Flour, bread.....	10.8	1.1	78.2	18.16	431,870	46,642	4,751	337,722
Do.....	13.4	.9	73.4	15.68	355,620	47,653	3,201	262,025
Flour, pastry.....	10.4	.8	78.6	15.68	355,620	36,984	2,845	279,517
Do.....	12.5	1.5	73.4	3.56	80,740	10,093	1,211	59,263
Flour, graham.....	14.4	1.7	72.4	.79	20,410	2,939	347	14,777
Hominy.....	8.5	.7	81.4	.81	4,080	347	29	3,321
Macaroni.....	12.6	.4	74.9	1.00	4,535	571	18	3,401
Maple sirup.....			64.7	2.97	14,970			9,686
Molasses.....			73.1	1.68	29,940			21,886
Oats, rolled.....	17.7	7.0	64.2	11.16	106,595	18,867	7,462	68,434
Rice.....	9.1	.7	76.7	.65	4,535	413	32	3,478
Sugar.....			100.0	55.30	557,475			557,475
Tapioca.....	.6	.4	86.6	.42	3,175	19	13	2,750
Total				143.25	2,095,215	176,423	32,789	1,714,038
Vegetables:								
Beans, Yellow Eye.....	23.4	1.4	57.2	3.92	50,805	11,888	711	29,060
Beans, white.....	22.1	1.5	57.7	3.04	39,465	8,722	592	22,771
Beets.....	1.3	.2	7.3	.46	25,855	336	52	1,887
Cabbage.....	1.4	.2	5.6	5.20	117,935	1,651	236	6,604
Carrots.....	1.0	.3	9.2	.68	3,630	36	11	334
Cucumbers.....	.5	.5	3.4	.50	15,875	79	79	540
Onions.....	1.7	.2	9.7	.76	17,235	293	34	1,672
Potatoes.....	1.9	.1	19.1	27.10	1,481,000	28,139	1,481	282,871
Potatoes, sweet.....	1.8	.4	31.9	10.90	247,210	4,450	989	78,860
Pumpkin, canned.....	1.2	.3	7.5	1.33	15,875	190	48	1,191
Squash, canned.....	.8	.4	8.2	.10	1,360	11	5	111
Squash, green.....	1.6	.4	8.9	.57	10,435	167	42	929
Sweet corn, ears.....	2.8	1.0	22.6	5.00	45,360	1,270	454	10,250
Sweet corn, canned.....	2.7	1.1	11.5	4.54	27,445	741	302	3,156
Tomatoes, fresh.....	1.3	.4	3.6	8.38	190,285	2,474	761	6,851
Turnips.....	.7	.4	10.6	.74	47,630	333	191	5,048
Cucumber pickles.....	.7	.2	1.4	3.06	22,225	156	42	311
Horse radish, evaporated.....	11.0	.8	77.7	.20	180	20	14	140
Horse radish, fresh.....	1.6	.1	11.3	.97	2,950	47	3	333
Catsup.....	1.1	.1	8.5	2.85	6,805	75	7	578
Total				79.70	2,369,560	61,078	6,056	453,497
Fruits:								
Apples.....	.3	.5	14.1	22.50	680,400	2,041	3,402	95,916
Bananas.....	1.1	.6	13.9	4.37	56,700	624	340	7,881
Blackberries, fresh.....	1.1	2.9	16.7	7.50	34,020	374	986	5,681

TABLE 14.—*Food materials and table and kitchen wastes in dietary No. 151—Cont'd.*

Kind of food material.	Composition.			Weight used.				
	Protein.	Fat.	Carbohydrates.	Total cost.	Total food material.	Nutrients.		
VEGETABLE FOOD—continued.						Protein.	Fat.	Carbohydrates.
Fruits—Continued.								
Blueberries, canned	0.8	0.9	12.2	\$5.02	30,390	243	274	3,707
Citron	.6	2.5	83.7	.45	680	4	17	569
Crab apples, canned	.3	2.4	54.3	1.27	11,565	35	278	6,280
Cranberries	.4	.4	9.5	4.50	13,610	54	54	1,293
Currants, dried	1.5	1.2	60.0	.65	4,535	68	54	2,721
Pineapple, canned	.4	.7	36.4	1.22	4,990	20	35	1,816
Prunes, dried	3.1	2.9	68.0	1.60	9,070	342	320	7,498
Raisins	2.3	2.3	71.3	.85	7,710	177	177	5,497
Total				49.93	853,670	3,982	5,937	138,889
Total vegetable food				272.88	5,318,445	241,483	44,782	2,306,424
Total food				959.73	10,412,370	572,257	786,279	2,467,045
COOKED FOOD, ETC., NOT EATEN.								
Animal food:								
Beef, boiled	26.1	34.9	.....	4.80	10,885	2,841	3,798	.....
Beef, roast	27.0	30.9	.....	1.32	905	244	280	.....
Beef, round	14.9	17.5	.....	11.90	54,205	8,077	9,486	.....
Beef suet	3.3	82.0	.....	1.38	10,435	344	8,557	.....
Total				19.40	76,430	11,506	22,121	.....
Lamb, fore quarter	14.7	21.0	.....	2.52	12,700	1,867	2,667	.....
Lamb, fat scraps	19.0	75.8	.....		39,465	7,498	29,914	.....
Total				2.52	52,165	9,365	32,581	.....
Pork, fried	19.9	45.4	.....		905	180	411	.....
Total animal food				21.92	129,500	21,051	55,113	.....
Vegetable food:								
Cereals, sugars, and starches—								
Bread, flour	6.9	.9	72.7		43,545	3,004	392	31,656
Cake, frosted	5.1	9.5	71.0		3,400	173	323	2,414
Cake, fruit	4.8	12.4	62.2		680	33	84	423
Cake, sponge	5.8	13.0	57.3		9,980	579	1,297	5,718
Cookies, molasses	7.1	9.5	76.4		455	32	43	348
Cookies, sugar	7.3	12.6	73.9		3,040	222	383	2,247
Doughnuts	6.9	22.3	51.9		2,495	172	556	1,295
Pie, apple	2.8	9.7	46.2		565	16	55	261
Pie, cream	2.1	17.9	42.3		4,835	103	876	2,071
Pie, mince	4.5	12.6	39.7		225	10	28	89
Total					69,280	4,344	4,037	46,522
Vegetables:								
Mince-meat	6.3	8.1	33.5	1.70	7,710	486	624	2,583
Potatoes, boiled	3.1	.2	23.9		4,535	141	9	1,084
Total				1.70	12,245	627	633	3,667
Apple sauce	.2	.9	37.1		4,990	10	45	1,851
Total vegetable food				1.70	86,515	4,981	4,715	52,040
Total food				23.62	216,015	26,032	58,828	52,040
WASTE.								
Animal food:								
Meat	24.0	33.3	.....		88,680	21,283	29,530	.....
Fish	22.7	16.5	.....		36,290	8,238	5,988	.....
Oyster stew	3.6	5.5	8.3		38,555	1,388	2,121	3,200
Total animal waste					163,525	30,909	37,639	3,200
Vegetable food:								
Bread	8.3	4.7	47.6		169,190	14,043	7,952	80,534
Vegetable	2.2	2.4	19.6		1,239,690	27,273	29,752	242,979
Mixed waste	4.1	6.0	19.8		254,695	10,442	15,282	50,130
Total vegetable waste					1,663,575	51,758	52,986	373,943
Total waste					1,827,100	82,667	90,625	377,143

TABLE 15.—Weights and percentages of food materials and nutritive ingredients used in dietary No. 151.

Kind of food material.	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
FOR CLUB, 49 DAYS.										
Beef, veal, and mutton.	848, 180	124, 998	109, 034	.....	1, 870	275	240	.....	\$209. 27
Pork, lard, etc.	399, 845	26, 855	249, 076	.....	881	59	550	.....	77. 34
Poultry	32, 660	4, 376	3, 332	.....	72	10	7	.....	16. 80
Fish, etc.	212, 510	24, 156	7, 139	1, 225	468	53	16	3	47. 52	
Eggs	169, 420	26, 260	18, 297	.....	373	58	40	.....	48. 55
Butter	235, 420	4, 944	191, 867	.....	519	11	422	.....	129. 75
Milk and cream	3, 066, 340	98, 134	107, 639	159, 396	6, 760	216	237	351	135. 70	
Total animal food	4, 964, 375	309, 723	686, 384	160, 621	10, 943	682	1, 512	354	664. 93	
Cereals, sugars, starches	2, 025, 935	172, 079	28, 752	1, 667, 516	4, 466	379	63	3, 673	143. 25	
Vegetables	2, 357, 315	60, 451	5, 423	449, 830	5, 197	133	12	991	78. 00	
Fruits	848, 680	3, 972	5, 892	137, 038	1, 871	9	13	302	49. 93	
Total vegetable food	5, 231, 930	236, 502	40, 067	2, 254, 384	11, 534	521	88	4, 966	271. 18	
Total food	10, 196, 305	546, 225	726, 451	2, 415, 005	22, 477	1, 203	1, 600	5, 320	936. 11	
PER MAN PER DAY.										
Beef, veal, and mutton.	241	36	31	.....	0. 54	0. 08	0. 07	.....	
Pork, lard, etc.	114	8	71	.....	.25	.02	.16	.....	
Poultry	9	1	1	.....	.02	.....	.....	.....
Fish, etc.	61	7	2	.....	.13	.02	.....	.....
Eggs	49	8	5	.....	.11	.02	.01	.....	
Butter	67	1	55	.....	.15	.....	.12	.....	
Milk	873	28	31	46	1. 93	.06	.07	0. 10		
Total animal food	1, 414	89	196	46	3. 13	.20	.43	.10	.19	
Cereals, sugars, starches	576	49	8	474	1. 28	.11	.02	1. 05		
Vegetables	671	17	2	129	1. 48	.04	.01	.28		
Fruits	243	1	2	39	.54	.....	.....	.09	
Total vegetable food	1, 490	67	12	642	3. 30	.15	.03	1. 42	.08	
Total food	2, 904	156	208	688	6. 43	.35	.46	1. 52	.27	
PERCENTAGES OF TOTAL FOOD.										
	Per cent.	Per cent.	Per cent.	Per cent.					Per cent.	
Beef, veal, and mutton.	8. 3	22. 9	15. 0	.....					22. 3
Pork, lard, etc.	3. 9	4. 9	34. 3	.....					8. 3
Poultry	.3	.8	.5	.....					1. 8
Fish, etc.	2. 1	4. 4	1. 0	0. 1					5. 1	
Eggs	1. 7	4. 8	2. 5	.....					5. 2
Butter	2. 3	.9	26. 4	.....					13. 8
Milk	30. 1	18. 0	14. 8	6. 6					14. 5	
Total animal food	48. 7	56. 7	94. 5	6. 7					71. 0	
Cereals, sugars, starches	19. 9	31. 5	4. 0	69. 1					15. 3	
Vegetables	23. 1	11. 1	.7	18. 6					8. 3	
Fruits	8. 3	.7	.8	5. 6					5. 4	
Total vegetable food	51. 3	43. 3	5. 5	93. 3					29. 0	
Total food	100. 0	100. 0	100. 0	100. 0					100. 0	

TABLE 16.—*Nutrients and potential energy in food purchased, rejected, and eaten in dietary No. 151.*

Kind of food material.	Cost.	Nutrients.			Fuel value.
		Protein.	Fat.	Carbohydrates.	
Food purchased:					
Animal	\$664.93	Grams.	Grams.	Grams.	Calories.
Vegetable	271.18	309,723	686,384	160,621	8,311,800
Total.....	936.11	546,225	726,451	2,415,005	18,897,000
Waste:					
Animal		30,909	.....	3,200	.....
Vegetable.....		51,758	.....	373,943	.....
Total.....		82,667	190,625	377,143	2,728,000
Food actually eaten:					
Animal		278,814	.....	.....	.....
Vegetable		184,744	.....	.....	.....
Total.....		463,558	635,826	2,037,862	16,169,000
PER MAN PER DAY.					
Food purchased:					
Animal .....	.19	88	195	46	2,360
Vegetable.....	.08	67	12	641	3,015
Total.....	.27	155	207	687	5,375
Waste:					
Animal		9	.....	1	.....
Vegetable.....		15	.....	107	.....
Total.....		24	126	108	780
Food actually eaten:					
Animal		79	.....	45	.....
Vegetable		52	.....	534	.....
Total.....		131	181	579	4,595
PERCENTAGES OF TOTAL FOOD PURCHASED.					
Food purchased:		Per cent.	Per cent.	Per cent.	Per cent.
Animal	71.0	56.7	94.5	6.7	44.0
Vegetable.....	29.0	43.3	5.5	93.3	56.0
Total.....	100.0	100.0	100.0	100.0	100.0
Waste:					
Animal		5.6	.....	1	.....
Vegetable.....		9.5	.....	15.5	.....
Total.....		15.1	12.5	15.6	14.4
Food actually eaten:					
Animal		51.1	.....	6.6	.....
Vegetable		33.8	.....	77.8	.....
Total.....		84.9	87.5	84.4	85.6

¹ Vegetable waste contained considerable animal fat.

In the fourth and fifth studies the change in the ordinary dietary was confined to the milk supply. This was not designed to show anything more than the comparative economy of milk as food. It must be conceded, as the preceding tables very clearly show, that no other animal food supplies edible solids of a high degree of quality at so small a cost as milk, and if its use does not increase the total food consumption it must be regarded as an economical article of diet. The milk used was above the average quality, and was much relished by a large

majority of the students. When it was supplied *ad libitum*, the quantity consumed increased from 969 pounds per week to 1,500 pounds, or an increase of nearly 55 per cent. This meant the use of about one pound more of milk per day per person in the fifth study than in the fourth.

So far as could be observed, the students were satisfied with this free use of milk, and there was no indication that it had any injurious effects upon their health.

STUDY OF A DIETARY CONTAINING A LARGE AMOUNT OF MILK.

In the fifth dietary study of this series the meat and vegetable foods were selected as under ordinary conditions. In addition, milk was furnished in large quantities. This was done with a view to determining the effect on the amount and cost of the nutrients actually consumed of using very liberal amounts of milk with the foods ordinarily consumed.

FIFTH DIETARY STUDY OF THE COLLEGE CLUB AT MAINE STATE COLLEGE (No. 152).

[Ordinary meats and a large consumption of milk.]

The study began October 21 and continued forty-nine days.

The number of meals taken was as follows:

	Breakfasts.	Dinners.	Suppers.
Men.....			
Women.....	3,567 196	3,975 196	3,541 196
Total.....	3,763	4,171	3,737
Meals eaten by men.....			11,083
Meals eaten by women (588 \times 0.8 meal of man) equivalent to.....			470
Total			11,553

Equivalent to one man for three thousand eight hundred and fifty-one days.

Remarks.—During this period the meats were again selected as under ordinary conditions, and a very large amount of milk was supplied. It was freely furnished at all of the three meals.

TABLE 17.—*Food materials and table and kitchen wastes in dietary No. 152.*

Kind of food material.	Composition.			Total cost.	Weight used.			
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.		
						Protein.	Fat.	
ANIMAL FOOD.								
Beef:								
Boiled	Per et.	Per et.	Per et.	\$4.80	Grams.	Grams.	Grams.	
Hind quarters	26.1	34.9	-----	147.18	10,885	2,841	3,799	
Round	14.9	17.5	-----		606,915	90,430	106,210	
Suet	18.1	12.6	-----	11.90	54,205	9,811	6,830	
Sausage, Frankfort	3.3	82.0	-----	1.38	10,435	344	8,557	
	15.4	17.4	-----	4.40	19,960	3,074	3,473	
Total				169.66	702,400	106,500	128,869	
Veal	15.1	6.3	-----	4.88	27,670	4,179	1,743	
Venison ¹	15.1	6.3	-----	13.90	63,050	9,521	3,972	

¹ Assumed to be the same composition as veal.

TABLE 17.—*Food materials and table and kitchen wastes in dietary No. 152—Continued*

Kind of food material.	Composition.			Total cost.	Weight used.				
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.			
						Protein.	Fat.	Carbohydrates.	
ANIMAL FOOD—continued.									
Mutton:									
Lamb, side.....	14.2	18.7	.....	\$13.77	Grams. 60,400	Grams. 9,855	Grams. 12,978	Grams.
Lamb, fore quarter.....	14.7	21.0	.....	2.52	12,700	1,867	2,667	.....
Total .....	.....	.....	.....	16.29	82,100	11,722	15,645	.....
Pork:									
Backs and ribs.....	13.8	25.5	.....	18.09	91,175	12,582	23,249	.....
Steak, fried.....	19.9	45.4	.....	.30	905	180	411	.....
Ham, fresh.....	11.7	36.0	.....	1.10	4,990	584	1,796	.....
Ham, smoked.....	13.3	33.4	.....	25.83	111,585	14,841	37,269	.....
Salt pork.....	2.7	80.3	.....	11.02	66,680	1,800	53,544	.....
Sausage.....	13.5	46.0	.....	5.20	29,485	3,980	13,563	.....
Lard.....	.....	95.7	.....	34.18	200,940	.....	192,300	.....
Total .....	.....	.....	.....	95.72	505,760	33,967	322,132	.....
Poultry:									
Chicken.....	13.4	10.2	.....	7.80	23,585	3,160	2,406	.....
Turkey.....	15.7	18.4	.....	11.04	31,300	4,914	5,760	.....
Total .....	.....	.....	.....	18.84	54,885	8,074	8,166	.....
Fish, etc.:									
Clams, shelled.....	10.6	1.1	5.2	2.00	11,340	1,202	125	590	
Halibut.....	16.4	8.4	.....	18.00	68,040	11,158	5,715	.....
Oysters, shelled.....	5.4	1.3	2.3	21.60	81,650	4,409	1,061	1,878	
Oysters, in shell.....	1.1	.2	.6	3.50	34,925	384	67	210	
Salmon.....	19.8	8.4	.....	9.87	17,915	3,547	1,505	.....
Total .....	.....	.....	.....	54.97	213,870	20,700	8,473	2,678
Eggs, no shells.....	15.5	10.8	.....	30.94	107,955	16,733	11,659	.....
Butter.....	1.3	81.8	.....	84.50	153,315	1,993	125,412	.....
Milk.....	3.2	3.5	5.2	207.76	4,711,995	150,784	104,920	245,024	
Mince-meat.....	6.3	8.1	83.5	1.70	7,710	486	624	2,583	
Total animal food.....	.....	.....	.....	699.16	6,630,710	364,659	791,615	250,285
VEGETABLE FOOD.									
Cereals, sugars, and starches:									
Flour, bread.....	10.8	1.1	78.2	.92	20,865	2,253	230	16,316	
Do.....	13.4	.9	73.4	13.28	301,190	40,360	2,711	221,074	
Flour, graham.....	14.4	1.7	72.4	1.19	30,845	4,441	524	22,332	
Flour, pastry.....	10.4	.8	78.6	18.80	426,385	44,344	3,411	335,138	
Do.....	12.5	1.5	73.4	8.20	185,975	23,247	2,790	136,506	
Cake, frosted.....	5.1	9.4	68.8	.....	2,720	139	256	1,871
Cake, fruit.....	4.8	12.4	62.2	.....	680	33	84	423
Cake, sponge.....	5.8	13.0	57.3	.....	9,980	579	1,297	5,718
Cookies, sugar.....	7.3	12.6	73.9	.....	3,040	222	383	2,247
Cornmeal.....	8.6	1.4	78.4	1.52	39,465	3,394	552	30,943	
Corustarch.....	.....	.....	85.9	3.92	22,225	.....	.....	19,090
Crackers, butter.....	10.3	13.6	71.3	3.72	28,125	2,897	3,825	20,054	
Crackers, oyster.....	9.6	10.4	69.7	4.26	32,205	3,092	3,349	22,448	
Hominy.....	8.6	.7	78.5	1.35	6,805	585	48	5,342	
Macaroni.....	12.6	.4	74.9	.30	1,360	171	5	1,019	
Maple sirup.....	.....	.....	64.7	8.10	40,825	.....	.....	26,414
Molasses.....	.....	.....	76.7	1.40	24,950	.....	.....	19,137
Oats, rolled.....	11.0	7.3	70.8	9.02	86,185	9,480	6,292	61,019	
Rice.....	8.4	.4	77.2	.32	2,270	191	9	1,752	
Sugar.....	.....	.....	100.0	49.81	502,135	.....	.....	502,135
Tapioca.....	.6	.4	86.6	.90	6,805	41	27	5,893	
Pie, apple.....	2.8	9.7	46.2	.....	9,070	254	880	4,190
Pie, cream.....	2.1	17.9	42.3	.....	5,895	124	1,055	2,494
Total .....	.....	.....	.....	127.01	1,790,000	135,847	27,728	1,463,555
Vegetables:									
Beans, white.....	22.1	1.5	57.7	3.81	49,440	10,926	742	28,526	
Beans, Yellow Eye.....	23.4	1.4	57.2	3.85	49,895	11,676	698	28,542	
Beans, string.....	1.0	.1	3.0	7.56	57,155	572	57	1,715	
Beets.....	1.8	.2	11.7	.29	16,330	294	33	1,910	
Cabbage.....	1.5	.1	6.0	1.64	37,195	558	37	2,232	
Carrots.....	1.0	.3	9.2	.20	9,070	91	27	834	
Celeri.....	1.1	.2	4.6	1.00	4,535	50	9	208	
Catsup, tomato.....	2.0	.5	16.1	5.70	13,610	272	68	2,191	

TABLE 17.—Food materials and table and kitchen wastes in dietary No. 152—Continued.

Kind of food material.	Composition.			Total cost.	Weight used.				
	Protein.	Fat.	Carbohydrates.		Total food material.	Nutrients.			
						Protein.	Fat.	Carbohydrates.	
VEGETABLE FOOD—continued.									
Vegetables—Continued.	Per et.	Per et.	Per et.		Grams.	Grams.	Grams.	Grams.	
Horse-radish, evaporated	11.0	0.8	77.7	\$1.16	1,315	145	10	1,022	
Onions.....	1.7	.3	8.8	1.20	27,215	463	82	2,394	
Peas, canned.....	4.2	.3	11.8	7.97	44,905	1,886	135	5,299	
Peas, split.....	25.2	1.2	62.6	2.28	38,875	9,797	467	24,336	
Pickles, cucumber.....	.7	.2	1.4	3.75	27,215	190	54	381	
Potatoes.....	1.5	.1	17.5	21.84	1,193,420	17,901	1,193	20,885	
Potatoes, sweet.....	1.8	.4	31.9	3.25	63,505	1,143	254	20,264	
Pumpkin, canned.....	1.2	.3	7.5	2.17	25,855	310	78	1,939	
Squash, canned.....	.8	.4	8.2	.80	10,885	87	44	892	
Squash, green.....	1.6	.4	8.9	3.70	67,135	1,074	269	5,975	
Tomatoes, canned.....	.4	.1	1.4	3.98	42,640	171	43	597	
Total				76.15	1,780,195	57,606	4,300	150,142	
Fruits:									
Apples, green.....	.3	.5	14.1	18.10	547,495	1,642	2,737	77,197	
Apple sauce.....	.2	.9	37.2	-----	4,990	10	45	1,856	
Apricots, dried.....	3.1	2.2	71.9	4.20	19,050	590	419	13,697	
Bananas.....	1.1	.6	13.9	3.01	39,010	429	234	5,423	
Blueberries, canned.....	.5	.5	12.4	8.10	48,990	245	245	6,074	
Citron.....	.6	2.5	83.7	.75	1,135	7	28	950	
Cranberries, fresh.....	.4	.4	9.5	1.76	5,445	22	22	517	
Currants, dried.....	2.2	.7	80.1	.78	5,445	120	38	4,361	
Grapes.....	1.1	1.1	25.5	4.75	18,600	205	205	4,743	
Jelly, currant.....	.2	7.1	67.5	-----	29,030	58	2,061	19,595	
Prunes, dried.....	3.3	.8	74.9	6.00	34,020	1,123	272	25,480	
Raisins.....	3.0	.5	78.8	2.65	24,020	721	120	18,944	
Total				50.10	777,230	5,172	6,426	178,886	
Total vegetable food.....				253.26	4,347,425	198,625	38,454	1,792,523	
Total food				952.42	10,978,135	563,284	830,069	2,042,808	
COOKED FOOD NOT EATEN.									
Animal food:									
Beef, corned.....	14.2	22.8	-----	8.64	48,990	6,957	11,170	-----	
Beef, roast.....	23.7	34.9	-----	1.32	4,990	1,183	1,742	-----	
Beef, meat scraps.....	24.2	27.7	-----	-----	13,610	3,293	3,770	-----	
Total				9.96	67,590	11,433	16,682	-----	
Oyster stew.....	3.7	4.7	19.3	-----	6,350	235	298	1,225	
Total animal food.....				9.96	73,940	11,668	16,980	1,225	
Vegetable food:									
Cereals, sugars, starches—									
Cake, chocolate.....	7.5	15.5	66.2	-----	680	51	105	450	
Cake, marble.....	6.3	14.7	64.7	-----	2,720	171	400	1,760	
Cookies, molasses.....	9.7	10.3	70.3	-----	2,270	220	234	1,596	
Doughnuts.....	7.0	20.9	57.0	-----	5,670	397	1,185	3,232	
Pie, raisin.....	3.0	11.3	47.2	-----	14,515	435	1,640	6,851	
Total				-----	25,855	1,274	3,564	13,889	
Vegetables: Potatoes, boiled.....	2.7	.2	25.2	-----	4,535	122	9	1,143	
Fruit: Prune sauce.....	.5	.1	22.3	-----	4,535	23	5	1,011	
Total vegetable food.....				-----	34,925	1,419	3,578	16,043	
Total food				9.96	108,865	13,087	20,558	17,268	
WASTE.									
Animal food:									
Meat, etc.....	22.5	27.4	-----	-----	132,450	29,801	36,292	-----	
Fish.....	21.6	26.6	-----	-----	31,750	6,858	8,446	-----	
Oyster stew.....	3.7	4.7	19.3	-----	23,135	556	1,087	4,465	
Total animal waste.....				-----	187,335	37,515	45,825	4,465	
Vegetable food:									
Bread.....	9.3	6.8	53.2	-----	190,060	17,676	12,924	101,112	
Vegetables	3.0	3.3	18.9	-----	1,268,720	38,062	41,868	239,788	
Total vegetable waste.....				-----	1,458,780	55,738	54,792	340,900	
Total waste.....				-----	1,646,115	93,253	100,617	345,365	

TABLE 18.—Weights and percentages of food materials and nutritive ingredients used in dietary No. 152.

Kind of food material	Weight in grams.				Weight in pounds.				Cost.	
	Food material.	Nutrients.			Food material.	Nutrients.				
		Protein.	Fat.	Carbohydrates.		Protein.	Fat.	Carbohydrates.		
FOR CLUB, 49 DAYS.										
Beef, veal, and mutton.	807,630	120,489	133,547	.....	1,781	265	294	.....	\$194.77
Pork, lard, etc.	505,760	33,967	322,132	.....	1,115	75	710	.....	95.72
Poultry	54,885	8,074	8,166	.....	121	16	20	.....	18.84
Fish, etc.	207,520	20,465	8,175	1,453	458	45	18	3	54.97	
Eggs	107,955	16,733	11,659	.....	237	37	26	.....	30.94
Butter	153,315	1,993	125,412	.....	338	4	276	.....	84.50
Milk	4,711,995	150,784	164,920	245,024	10,388	333	364	540	207.76	
Mince-meat	7,710	486	624	2,583	17	1	1	6	1.70	
Total animal food	6,556,770	352,991	774,635	249,060	14,455	776	1,709	549	689.20	
Cereals, sugars, starches.	1,764,145	134,573	24,164	1,449,666	3,890	297	53	3,196	127.01	
Vegetables	1,775,660	57,484	4,291	148,989	3,914	127	9	329	76.15	
Fruits	772,695	5,149	6,421	177,825	1,703	11	14	392	50.10	
Total vegetable food	4,312,500	197,206	34,876	1,776,480	9,507	435	76	3,917	253.26	
Total food	10,869,270	550,197	809,511	2,025,540	23,962	1,211	1,785	4,466	942.46	
PER MAN PER DAY.										
Beef, veal, and mutton.	211	31	36	.....	0.47	0.07	0.08	.....	.....
Pork, lard, etc.	132	9	84	.....	.29	.02	.19	.....	.....
Poultry	14	2	2	.....	.03	.....	.....	.....	.....
Fish, etc.	54	5	2	.....	.12	.01	.01	.....	.....
Eggs	28	4	3	.....	.06	.01	.01	.....	.....
Butter	40	1	33	.....	.09	.....	.07	.....	.....
Milk	1,223	39	43	64	2.71	.09	.09	0.14	.....
Mince-meat	2	.....	1	.....	.....	.....	.....	.....	.....
Total animal food	1,704	91	203	65	3.77	.26	.45	.14	.18	
Cereals, sugars, starches.	458	35	6	378	1.01	.08	.02	.83	.....
Vegetables	461	15	1	39	1.02	.03	.....	.09	.....
Fruits	201	2	1	46	.45	.01	.....	.10	.....
Total vegetable food	1,120	52	8	463	2.48	.12	.02	1.02	.07	
Total food	2,824	143	211	528	6.25	.32	.47	1.16	.25	
PERCENTAGES OF TOTAL FOOD.										
Beef, veal, and mutton.	7.4	21.6	16.8	.....	.....	.....	.....	.....	Per ct.
Pork, lard, etc.	4.7	6.2	39.7	.....	.....	.....	.....	.....	20.6
Poultry	.5	1.3	1.1	.....	.....	.....	.....	.....	10.2
Fish, etc.	1.9	3.7	1.0	0.1	.....	.....	.....	.....	2.0
Eggs	1.0	3.1	1.4	.....	.....	.....	.....	.....	5.8
Butter	1.4	.4	15.5	.....	.....	.....	.....	.....	3.3
Milk	43.4	27.6	20.3	12.1	.....	.....	.....	.....	9.0
Mince-meat	.....	.1	.1	.1	.....	.....	.....	.....	22.0
Total animal food	60.3	64.0	95.9	12.3	.....	.....	.....	.....	.2
Cereals, sugars, starches.	16.2	24.6	3.0	71.6	.....	.....	.....	.....	13.5
Vegetables	16.4	10.5	.5	7.3	.....	.....	.....	.....	8.1
Fruits	7.1	.9	.6	8.8	.....	.....	.....	.....	5.3
Total vegetable food	39.7	36.0	4.1	87.7	.....	.....	.....	.....	26.9
Total food	100.0	100.0	100.0	100.0	.....	.....	.....	.....	100.0

TABLE 19.—*Nutrients and potential energy in food purchased, rejected, and eaten in dietary No. 152.*

Kind of food material.	Cost.	Nutrients.				Fuel value.
		Protein.	Fat.	Carbohy- drates.	Calories.	
Food purchased:						
Animal.....	\$689.20	352,991	774,635	249,060	9,672,500	
Vegetable.....	253.26	197,206	34,876	1,776,480	8,416,500	
Total.....	942.46	550,197	809,511	2,025,540	18,089,000	
Waste:						
Animal.....		37,515		4,465		
Vegetable.....		55,738		340,900		
Total.....		93,253	100,617	345,365	2,734,100	
Food actually eaten:						
Animal.....		315,476		244,595		
Vegetable.....		141,468		1,435,580		
Total.....		456,944	708,894	1,680,175	15,354,900	
PER MAN PER DAY.						
Food purchased:						
Animal.....	.18	91	202	65	2,515	
Vegetable.....	.07	51	8	461	2,180	
Total.....	.25	142	210	526	4,695	
Waste:						
Animal.....		9		1		
Vegetable.....		14		89		
Total.....		23	126	90	705	
Food actually eaten:						
Animal.....		83		64		
Vegetable.....		37		372		
Total.....		120	184	436	3,990	
PERCENTAGES OF TOTAL FOOD PURCHASED.						
Food purchased:						
Animal.....	73.1	64.0	95.9	12.3	53.6	
Vegetable.....	26.9	36.0	4.1	87.7	46.4	
Total.....	100.0	100.0	100.0	100.0	100.0	
Waste:						
Animal.....		6.8		3		
Vegetable.....		10.2		16.8		
Total.....		17.0	112.4	17.1	15.1	
Food actually eaten:						
Animal.....		57.3		12.0		
Vegetable.....		25.7		70.9		
Total.....		83.0	87.6	82.9	84.9	

¹The vegetable waste contained considerable animal fat.

DISCUSSION OF THE INVESTIGATION AND ITS RESULTS.

The character of the preceding dietary studies may be briefly summarized as follows: The first dietary study was made under ordinary conditions, no attempt being made to select the food with any end in view, except to secure the necessary variety. In the second dietary the protein was secured from high-priced sources, and the milk supply was kept at a minimum. In the third dietary study the protein was

supplied from less costly sources, and the milk consumption was increased to a maximum. The fourth dietary study was made under normal conditions, except that the milk supply was limited. The fifth dietary study was also made under ordinary conditions, except that milk was very abundantly supplied.

EXTENT OF WORK.

The time occupied by the five dietaries was two hundred and nine days. The number of meals eaten was equivalent to fourteen thousand seven hundred and forty-five days, over forty years, for one man. The averages reached, therefore, are representative of the amount of food consumed by the class of persons involved in the investigation.

ACCURACY OF THE WORK.

With the exception of such meats as beef, lamb, veal, and venison, the principal food materials involved in these dietary studies were sampled and analyzed, especially those containing a large proportion of water or known to be of very variable composition. The meats not analyzed have been assumed to have an average composition. The errors involved in this method of procedure are small when the quantities of food, the number of persons, and the period of time are all on such a scale as to practically eliminate such inaccuracies from the final figures.

THE GROSS WEIGHT OF FOOD MATERIALS AND NUTRIENTS BOUGHT.

The following table shows the quantities of food materials purchased per man per day:

TABLE 20.—*Summary of food materials and nutrients purchased.*

	Total food materials.	Protein.		Fat.		Carbohydrates.		Dry organic matter.	
	Grams.	Pounds.	Grams.	Pound.	Grams.	Pound.	Grams.	Pounds.	
First dietary (No. 148).....	2,934	6.51	169	0.37	216	0.48	861	1.91	2.76
Second dietary (No. 149)....	2,806	6.23	173	.38	252	.56	620	1.38	2.32
Third dietary (No. 150)....	2,888	6.41	158	.35	218	.48	662	1.47	2.30
Fourth dietary (No. 151)....	2,904	6.43	156	.35	208	.46	688	1.52	2.33
Fifth dietary (No. 152)....	2,824	6.25	143	.32	211	.47	528	1.16	1.95
Average	2,871	6.37	156	.35	221	.49	672	1.49	2.32

The uniformity of the gross weights of food purchased in the several periods is somewhat surprising, ranging as they do between the limits 6.23 and 6.51 pounds per man daily, a variation of only 0.28 pound, or 4.5 per cent of the minimum quantity. This uniformity was probably accidental, as the amount of organic matter purchased varied more widely, from 1.95 to 2.76 pounds, or 0.81 pound, which is 41.5 per cent of the minimum quantity. It is worthy of remark also that the materials purchased contained a large proportion of fats and carbohydrates and a correspondingly small proportion of protein. As a steward is largely controlled in his selection of foods by local customs and tastes,

we may take these data as an illustration of a typical New England college boarding house table supply when the materials are all purchased in the markets.

The gross weights of food materials purchased seem to be very large, nearly double that of a similar dietary study in Tennessee,¹ for instance. This is explained in part by the fact that in Maine the proportion of milk and meats was larger and of the cereals smaller than in Tennessee. The more water a food contains the greater the weight that must be eaten in order to obtain a given amount of nutriment. Meats, and especially milk, are much more watery than the cereals and sugars; consequently a free use of the former tends to increase the weight of food taken. In Maine the meats were 55 per cent and the cereals, etc., 20 per cent of the total weight of food, whereas in Tennessee the meats were 41 per cent and the cereals 38 per cent.

Again, the waste in Maine was larger than in Tennessee, and therefore the purchased food would be greater, other conditions being equal.

COMPARATIVE QUANTITY AND COST OF ANIMAL AND VEGETABLE FOODS.

It is interesting and suggestive to note the relations in quantity and cost of the animal and vegetable foods in the five dietaries. These relations are very clearly shown in the following abstract of figures from the second table in each dietary:

TABLE 21.—*Relative amounts of nutrients in animal and vegetable foods.*

Food materials.	Nutrients.				Cost.
	Protein.	Fats.	Carbohydrates.	Per cent.	
First dietary (No. 148):					
Animal food.....	51.8	59.8	93.5	5.8	63.7
Vegetable food.....	48.2	40.2	6.5	94.2	36.3
Second dietary (No. 149):					
Animal food.....	57.4	71.7	96.5	8.6	72.8
Vegetable food.....	42.6	28.3	3.5	91.4	27.2
Third dietary (No. 150):					
Animal food.....	58.6	63.4	95.3	9.8	66.4
Vegetable food.....	41.4	36.6	4.7	90.2	33.6
Fourth dietary (No. 151):					
Animal food.....	48.7	56.7	94.5	6.7	71.0
Vegetable food.....	51.3	43.3	5.5	93.3	29.0
Fifth dietary (No. 152):					
Animal food.....	60.3	64.2	95.7	12.3	73.1
Vegetable food.....	39.7	35.8	4.3	87.7	26.9
Average:					
Animal food.....	54.5	63.0	95.0	9.0	69.0
Vegetable food.....	45.5	37.0	5.0	91.0	31.0

The gross weight of the animal foods purchased varied from 48.7 to 60.3 per cent of the total food, and their cost varied from 63.7 to 73.1 per cent of the total cost. The average gross weight of the animal foods for the entire two hundred and nine days was 54.5 per cent of the total food weight, and their proportion of cost was 69.2 per cent of the total cost. These figures illustrate the relative economic importance of the animal food of the dietary, and, considered in connection with the great

¹ U. S. Dept. Agr., Office of Experiment Stations Bul. 29.

variation in the cost of the nutrients in the different kinds of meat, show very clearly the direction in which a family of moderate means has the largest and most promising opportunity for the exercise of economy.

When we see that practically two-thirds of the protein and nearly all of the fat were supplied from the animal foods and over nine-tenths of the carbohydrates from the vegetable foods, it is easy to understand how the character of the diet is readily modified by varying the proportions of the two classes of nutrients. The family that is able to afford a generous supply of meats is very differently nourished from the families of limited means, where the flour barrel is the chief source of food.

THE REFUSE AND WASTE.

That portion of the food materials which was not eaten included not only that which was edible and was really wasted, but also the refuse, or that which, because not edible, was necessarily rejected. The percentages of the waste in the five dietary studies follow:

TABLE 22.—*Summary of waste in the five dietary studies.*¹

	Total.	Protein.	Fats.	Carbohydrates.	Fuel value.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
First dietary (No. 148):					
Animal.....	7.5	16.1	30.8	12.7	11.7
Vegetable.....	9.7	5.3	.9	12.7	8.1
Total.....	17.2	21.4	31.7	12.7	19.8
Second dietary (No. 149):					
Animal.....	13.0	29.3	33.9	16.3	17.8
Vegetable.....	10.7	5.4	.6	16.3	8.4
Total.....	23.7	34.7	34.5	16.3	26.2
Third dietary (No. 150):					
Animal.....	13.5	20.4	50.0	19.9	21.2
Vegetable.....	14.1	7.9	.8	19.9	11.3
Total.....	27.6	28.3	50.8	19.9	32.5
Fourth dietary (No. 151):					
Animal.....	2.0	5.6	1.0	.1	.....
Vegetable.....	12.9	9.5	11.5	15.5	.....
Total.....	14.9	15.1	12.5	15.6	14.4
Fifth dietary (No. 152):					
Animal.....	1.8	6.8	1.3	.3	.....
Vegetable.....	13.3	10.2	12.4	16.8	.....
Total.....	15.1	17.0	11.1	17.1	15.1

¹For methods by which the wastes in the different dietaries were determined, see pp. 39, 40.

A fair discussion of the preceding figures requires the statement that the college commons was not under the same management in the spring term, including dietaries 1, 2, and 3, as in the fall term during dietaries 4 and 5.

In the spring term the waste was 17 per cent of organic matter during the first dietary, and increased from this to 24 per cent in the second dietary and 28 per cent in the third. The excessive waste in the third dietary was probably due in part to the large proportion of fat in the meats, which would be rejected during warm weather.

Diетaries 4 and 5 stand in strong contrast to diets 1, 2, and 3, as in the former the waste did not exceed 15 per cent. This is a striking illustration of the possible difference which may exist in the economy of management of the food supply of a family or boarding house.

The large waste of nutrients in the spring term is emphasized by the fact that the loss of fats was in greater proportion than that of other nutrients, thus involving a larger relative waste of food energy than is indicated by the percentages of organic matter. When the waste of organic matter was 17, 24, and 27 per cent, the corresponding waste of fuel value was 20, 26, and 32 per cent.

While the waste in the fall term is not as low as it might be under more favorable circumstances, it was not greater than frequently exists under boarding-house conditions, where there is not a concerted action on the part of the boarders toward economizing in all reasonable ways.

THE FOOD ACTUALLY EATEN.

In considering the results of these dietary studies, so far as it relates to food consumption, the following facts pertaining to the conditions should be taken into account:

In the spring term the period of observation began during the cold weather of February and ended during the warm weather of June, and included a period during which there is usually a marked decrease of appetite.

In the fall term the conditions were reversed, and there was a gradual change to cold weather, which, other things being equal, increases the appetite.

The supply of animal foods, and to some extent of vegetable foods, was purposely changed in passing from one period to another.

The nutrients consumed in these dietary studies are briefly summarized in the following table:

TABLE 23.—*Summary of amounts and fuel value of nutrients consumed.*

	Protein.	Fats.	Carbohydrates.	Fuel value.
SPRING TERM.				
First dietary (No. 148): Usual food supply.....	Grams.	Grams.	Grams.	Calories.
132	147	751	4,990	
Second dietary (No. 149): Costly meats; milk limited.....	112	164	517	4,105
Third dietary (No. 150): Milk in abundance; other protein less costly.....	112	106	530	3,620
FALL TERM.				
Fourth dietary (No. 151): Milk supply limited.....	131	181	579	4,595
Fifth dietary (No. 152): Milk supply unlimited.....	120	184	436	3,990
Voit's standard, man at moderate work.....	118	56	500	3,055
American standard (Atwater), man at moderate work.....	125	.....	.....	3,500

It will be noticed that the consumption of fats and carbohydrates was especially large, while the amount of protein was more nearly in accord with the so-called dietary standards.

The amount of nutrients consumed in the first dietary (from February 25 to April 24) is especially excessive, particularly in the case of the carbohydrates. While this may be explained in part by the uniformly keener appetites of the students at the beginning of a term, it was probably chiefly due to the abundant supply of maple sirup which was furnished during this period. The use of so much sirup involved a correspondingly large consumption of flour. Seventy-four grams of maple sirup and 358 grams of flour were consumed daily per man during the first dietary, whereas during the succeeding dietaries scarcely any sirup was eaten and only 281 grams of flour per day. There can be but little doubt that the free use of sirup on the table leads to an excessive proportion of carbohydrates in the dietary.

The marked decrease in the food consumption as the term progressed is probably accounted for by the gradual elevation of temperature and the changes in the physical condition of the students. The food consumption changed from a fuel value of about 5,000 calories in February, March, and April to less than 3,700 calories in May and June.

THE INFLUENCE OF THE SUPPLY OF ANIMAL FOODS UPON THE SIZE AND COST OF THE DIETARY, WITH ESPECIAL REFERENCE TO MILK.

As has been stated, the attempt was made in four dietary studies to deliberately control to some extent the supply of animal foods and the source of protein. The attempt was also made to determine the relative value of milk in the dietaries.

The following table briefly summarizes the amounts and kinds of food materials purchased in the four dietaries:

TABLE 24.—*Foods purchased in four dietaries.*

	Foods purchased daily per man.			
	Dietary 149: Milk limited, other protein high cost.	Dietary 150: Milk unlimited, other protein low cost.	Dietary 151: Milk limited.	Dietary 152: Milk unlimited.
Animal food:				
Beef, veal, and mutton.....	337	130	241	211
Pork, lard, etc.....	76	172	114	132
Poultry.....	71	.....	9	14
Fish, etc.....	89	69	61	54
Eggs.....	112	53	49	28
Butter.....	83	74	67	40
Milk.....	810	1,197	873	1,223
Mince meat.....	33	.....	.....	2
Total.....	1,611	1,695	1,414	1,704
Vegetable food:				
Cereals, sugars, etc.....	476	595	576	460
Vegetables.....	638	477	671	464
Fruits.....	80	121	243	202
Total.....	1,194	1,193	1,490	1,126
Total food.....	2,805	2,888	2,904	2,836

In the following table the results of the studies are shown in another form:

TABLE 25.—*Gross weights of food purchased per man per day.*

	Milk.	Animal foods other than milk.	Vegetable foods.	Total foods.
	Grams.	Grams.	Grams.	Grams.
Dietary No. 149: Milk supply limited; high-cost protein.	810	801	1,195	2,806
Dietary No. 150: Milk supply unlimited; lower-cost protein.	1,197	498	1,193	2,888
Dietary No. 151: Milk supply limited.	873	541	1,490	2,901
Dietary No. 152: Milk supply unlimited.	1,223	481	1,126	2,836

The tables show very conclusively that the intention to materially modify the kind of animal foods in passing from dietary No. 149 to dietary No. 150 was carried out. The use of beef, veal, mutton, poultry, and eggs was greatly diminished and the consumption of pork and milk increased. The butter eaten was less in the latter period also. In dietaries Nos. 151 and 152 the character of the animal foods other than the milk did not differ greatly. The quantities of high-cost meats were less, but their place was not taken by low-cost meats.

The above figures leave no room for doubt that the free use of milk diminishes the consumption of other foods. In passing from dietary No. 149 to No. 150 the milk consumption per man increased from 810 grams daily to 1,197, and the use of other animal foods decreased from 801 grams to 498 grams, while the vegetable foods were eaten in about the same quantities in the two studies.

Essentially the same result follows in dietaries Nos. 151 and 152, where the milk eaten increased from 873 grams daily to 1,223, the consumption of other animal foods decreasing from 541 grams to 481, and of vegetable foods from 1,490 to 1,126 grams. In the first instance the milk replaced other animal foods, and in the second there was mainly a decrease in the use of vegetable foods. But while the increased consumption of milk diminished the consumption of other materials, what was the effect upon the actual quantity of nutrients taken and upon the cost of the dietary?

The answer to the question is very definite, and may be found in the following comparison of the results of the investigations:

TABLE 26.—*Comparison of nutrients eaten.*

	Nutrients per day per man.				
	Protein.	Fats.	Carbohydrates.	Total.	Cost.
Second dietary (No. 149): Milk limited:					
Animal foods.....	Grams.	Grams.	Grams.	Grams.	Cents.
72	158	53	283	.....	.....
Vegetable foods.....	40	6	464	510	.....
Total foods.....	112	164	517	793	34
Third dietary (No. 150): Milk unlimited:					
Animal foods.....	Grams.	Grams.	Grams.	Grams.	Cents.
67	98	65	230	.....	.....
Vegetable foods.....	45	8	465	518	.....
Total foods.....	112	106	530	748	26

TABLE 26.—*Comparison of nutrients eaten—Continued.*

	Nutrients per day per man.				
	Protein.	Fats.	Carbohy- drates.	Total.	Cost.
Fourth dietary (No. 151): Milk limited:					
Animal foods.....	Grams.	Grams.	Grams.	Grams.	Cents.
79			45		
Vegetable foods	52		534		
Total foods.....	131	181	579	891	27
Fifth dietary (No. 152): Milk unlimited:					
Animal foods.....	Grams.		64		
83					
Vegetable foods	37		372		
Total foods.....	120	184	436	740	25

The results are stated in another form in the following table:

TABLE 27.—*Summary of nutrients eaten daily per man.*

	Protein.	Fat.	Carbohy- drates.	Total.	Daily cost per man.
	Grams.	Grams.	Grams.	Grams.	Cents.
SPRING TERM.					
Second dietary (No. 149): Milk supply limited	112	164	517	793	34
Third dietary (No. 150): Milk supply unlimited	112	106	530	748	26
Difference (increase +, decrease —)		—58	+13	—45	—8
FALL TERM.					
Fourth dietary (No. 151): Milk supply limited.....	131	181	579	891	27
Fifth dietary (No. 152): Milk supply unlimited	120	184	436	740	25
Difference (increase +, decrease —)	—11	+3	—143	—151	—2

It appears that instead of causing an increased consumption of nutrients, the freer use of milk was attended by a decrease of the nutrients eaten in the spring term amounting to 45 grams daily and in the fall term to 151 grams daily. In the spring term it might reasonably be urged that the coming of warm weather would have the effect noted, all other conditions remaining the same, but this cause certainly could not have been operative in the fall term, when milk was freely supplied, for cold weather came on, and this ordinarily causes a keener appetite. It is interesting to note that in the spring term the additional milk replaced other animal foods, while in the fall term it replaced vegetable foods. It is reasonable to regard this as to some extent a case of involuntary selection of foods, as with the advent of warm weather the tendency would be to reject animal foods, while the effect of cold weather would be the reverse.

The financial outcome is favorable to the free use of milk. Notwithstanding the largely increased waste, the cost per man per day in the third dietary is 8 cents less than in the second.

The total decrease in the cost of food during dietary No. 150 as compared with dietary No. 149 was about \$4.50 per day. The saving should not be credited wholly to the increased supply of milk, because the other animal foods were in part of a less expensive kind.

The saving in dietary No. 152 was less, amounting to only 2 cents per day per man, or a total of \$1.57 daily. This smaller saving is equal, however, to \$416 for a school year of thirty-six weeks with the number of persons included in third dietary study. It should be noted that this saving was made in spite of the increased proportion of animal foods, an increase which, other conditions remaining unchanged, raises the cost of living.

If, as we have reason to believe, it be true that the average American dietary contains too large a proportion of nonnitrogenous compounds, then the free use of milk, besides cheapening the cost of living, accomplished another desirable result, viz., it raised the proportion of protein in the dietary, thereby making it more rational. The nutritive ratios of the dietaries with a limited supply of milk were 1:7.9 and 1:7.5, and of the dietaries where milk was freely used 1:6.7 and 1:6.8.

SUMMARY.

The main results of these dietary studies are briefly summarized with especial reference to their important practical relations to the economical purchase of human foods.

(1) The cost of the animal foods bought for the commons of the Maine State College during two hundred and nine days was 69 per cent of the total food cost, varying in the different periods from 63.7 to 73.1 per cent. This shows very clearly the direction in which economy can most effectively be exercised in purchasing a food supply.

(2) The freer use of milk did not, as is supposed by some to be the case, increase the gross weight of food eaten. The extra amount of milk consumed replaced other animal foods to a nearly corresponding extent in the first trial and caused a proportionate diminution in the consumption of vegetable foods in the second study.

(3) The actual quantity of water-free nutrients eaten diminished rather than increased when more milk was supplied. This is in marked contrast to the apparent effect of the free use of maple sirup, which was accompanied by a notably large consumption of nutrients.

(4) In both trials the increased consumption of milk had the effect of materially narrowing the nutritive ratio of the dietary, a result which, in view of the recognized tendency of Americans to consume an undue proportion of fats and carbohydrates, appears to be generally desirable.

(5) The dietaries in which milk was more abundantly supplied were somewhat less costly than the others and at the same time were fully as acceptable.

(6) These results indicate that milk should not be regarded as a luxury, but as an economical article of diet, which families of moderate income may freely purchase as a probable means of improving the character of the dietary and of cheapening the cost of their supply of animal foods.

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